THE NOTE BOOK OF AN ELECTRO-THERAPIST

MEL. R. WAGGONER, M. D.

The Note Book
of an
Electro-Therapist

MEL. R. WAGGONER, M. D.

ILLUSTRATED

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Introduction

I BELIEVE it a conservative statement to say that there is hardly a diseased condition in which electricity is not indicated either as an adjunct or actual curative measure, for the reason that with it we can produce mechanical, chemical and thermal changes. These are the three main weapons that nature uses in her attempt to maintain normal function. First, she must raise the temperature of the affected parts. If it is local we call it inflammation; if general, fever. By so doing she increases chemical activity. She then hastens the circulation (mechanical) in order to drain the decomposed products away.

Technic has developed tremendously in the last few years; so much so that there is no present day literature which is really up to date. In fact most of our literature has no real technic, yet this spells the difference between success and failure in the use of electricity. Is it any wonder then that smarter men than you and I have relegated their apparatus to the junk heap and tabooed electricity?

Before we can apply electricity and do it rationally we must remove the cloak of mystery from it and view it in its simple forms. We must also do the same with human functions. Remember the action of the individual cell is the simplest of mechanical and chemical actions. It is the combination of these actions that give us the complex human organism. We must attempt to figure the various functions of the body on the basis of definite mechanical and chemical actions, otherwise we are not practicing a true science, for a science is not a science unless it is definite. Do not monkey with methods of treatment which are mysterious in their action, for when you are using

something mysterious to cure something equally mysterious, then your results are mysterious. In other words you do not know why your case got well or why he did not.

For example let us take the so-called abdominal tone. How many of us know exactly what tone is, and how it is produced? We know that there is such a thing but other than that have given it no further attention. The truth is that it is the simplest of mechanical actions and may be explained very nicely by comparing it to the ordinary gasoline engine.

Supposing we draw a picture showing on one side the abdomen on the other a gasoline engine (see Fig. 1).

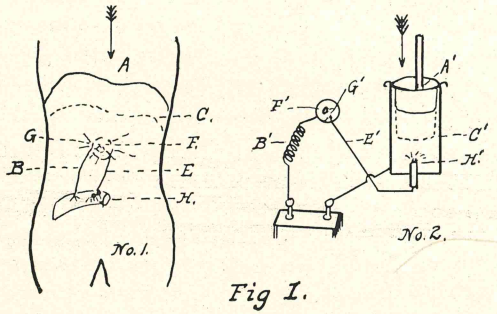


Fig 1.

As the diaphragm descends to point "C" intra abdominal pressure is increased which produces a pinch on the fine nerve terminals "A" of the afferent system. This produces a reflex irritation which is carried to the solar plexus (abdominal brain) which is the great receiver and distributor of all sympathetic reflexes and may be compared to the high tension coil and distributor of the gasoline engine. From here it is sent out over the efferent system to the plexii of Auerbach in the musculature and Meisner in the secretory part to produce tone or function. Just the same as the current from the distributor is delivered to the spark plug.

It is at once apparent that when treating diseases of the pelvis, abdomen, or thorax, in order to produce a true tonic effect the current must be delivered in rhythm with respiration.

Therefore, when reading a book on, let us say constipation, when we come to the technic which says, "give ten slow sine waves a minute," we at once know that that is poor technic, for there are no two patients constituted the same. The proper technic would be to give, twelve or fourteen per minute or whatever is the rate of the patient's breathing, which on lying down is usually about that number.

Even this is not really correct. For example we may deliver the electrical discharge to the gasoline engine but if we do not have it timed exactly right we lose the efficiency of that piston. Of course it works, but in an unsatisfactory way. The same holds true in the human body. If we wish to get the full tonic effect from our treatment, it should be timed exactly right.

This time is the last half of inspiration. You can at once see that the ordinary interrupter or electrical apparatus cannot possibly do this for the reason that the patient is not always breathing the same. One breath will be long and deep, and perhaps the next short and shallow.

To overcome this I have developed an apparatus called the Respiratory Interrupter, consisting of a switching mechanism which is strapped on the patient's chest, and is run by the respiration itself, thus automatically delivering a current of the right length and strength at exactly the right time. It may be used in conjunction with any apparatus delivering a rapid sinusoidal current; this new modality we shall refer to as the "Respiroidal" current and will be explained thoroughly later on.

Another serious mistake made by electro-therapeutists is that they do not distinguish clearly between the different currents. The high frequency is for thermal effects, the

sinusoidal for mechanical or massage, and the galvanic for polar or chemical effects. Do not try to make one current perform the duties of the other.

We may stimulate with the high frequency but we can not control the stimulation or produce the real massage effect that we can with the sinusoidal. We can also increase chemical activity with high frequency but we can not change gross chemistry like we can with the galvanic. We can also heat the tissues with the galvanic but it is greatly inferior to the high frequency. Using these currents outside of their field of action is very much like cutting meat with a fork when you have a knife, and the most important point is this that you soon get to a point where you do not know what you are doing with the currents.

Remember—select the high frequency for thermal effects, the sinusoidal for mechanical and the galvanic for polar or chemical action. Make your diagnoses with these three points constantly in view. Ask yourself the question, "Does the case treated need thermal changes, mechanical, or chemical, or combinations?" Usually the latter is indicated, particularly in chronic cases. Supposing we have a case of a boil—nature has already raised the temperature locally so we do not need the high frequency; she has also increased the circulation producing an active congestion to carry the decomposed products away, so we do not need the sinusoidals. Now let us test the discharge and if it is acid we have an indolent boil and the negative—(alkaline) pole is indicated and we combine cataphoresis using potassium iodide. Or if the litmus paper shows it to have an alkaline reaction, the boil is very acute, and the positive (acid) pole is indicated, thus we would combine copper cataphoresis.

Supposing the case to be an old chronic uterine cervicitis erosions, etc.

If we put an ordinary clinical thermometer in the cervix, nine times out of ten it will register sub-normal. The

cervix itself is thickened and shows stasis, i. e. poor circulation. At the same time we have a chronic inflammation with infection and if we test the discharges we will usually find them markedly acid, which is characteristic of all chronic indolent inflammations. We have in this case indications for all of the currents. How shall we proceed.

First, we must increase the temperature for nature can not clean up disease without good thermal conditions to increase body chemistry. So the first thing to do is to give a diathermic treatment followed by a few minutes of the sinusoidal current for massage. The next day give a negative galvanic treatment, also followed with a few minutes sinusoidal massage, and you will be surprised how quickly these cases will get well.

The same principles apply in the nose or elsewhere. Take an old, chronic arthritis. Of course we cannot get in there and test the reactions but if we could we would find acidity. In a few cases with effusion I have had a chance to make these tests and have found the acidity to be present. So in treatment we would follow the same technic. First give a diathermic treatment for thermal effect immediately followed by sinusoidal to massage the circulation and lymphatics, at the same time affecting any present adhesions. The next day apply negative galvanism, only instead of using potassium iodide, I would use soda salycilate, as we know that remedy has specific action for rheumatic conditions and I would follow it with a few minutes of the sinusoidal. You can see that the principle is the same.

CHAPTER I

FUNDAMENTALS OF ELECTRICITY

The flow of electricity is caused by the unbalanced condition of the electrons. Normally every atom contains enough electrons to balance the positive electricity in the atom. If one or more electrons leave an atom from any cause, the atom becomes positively charged. If the atom takes on electrons, it becomes negatively charged.

The difference in potential of unbalanced substances is called voltage or electro-motive-force and is what causes it to flow through any conductor. Voltage is represented by the symbol "E".

Ohm discovered that the rate of flow of the electricity in a circuit was in direct proportion to voltage and in inverse proportion to the resistance of the circuit. To explain, if we had a fountain syringe full of water and held it two feet above the ground, it would flow at a certain speed. If we now raised it four feet it would flow twice as fast. It would also flow faster out of a tube one inch in diameter than it would one of one-quarter inch. The same thing holds true with electricity. If the voltage or difference in potential in one circuit was twice as great as the voltage in another circuit of equal resistance, the rate of flow would also be twice as great. Also the rate of flow would be greater through copper than through German silver, as the former is a good conductor, while the latter is high in resistance. The symbol "I" is used to represent current or rate of flow. The symbol "R" is used to represent resistance.

Ohm's law is usually expressed by the equation "I" (current) equals "E" voltage divided by "R" (resistance).

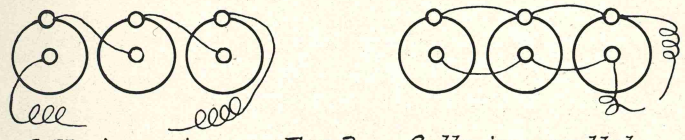
One ohm is the resistance which will allow one ampere of current to flow under a pressure of one volt.

Current is expressed in units of one ampere. As one ampere is a heavy dose for the delicate structures of the human body, we subdivide it into milliamperes or thousandth parts of an ampere.

The watts are equal to the volts times the amperes. This is given for the purpose of drawing your attention to the fact that watts should never be considered in electro-therapeutics.

Supposing we are going to treat two cases and we are going to use ten watts in each. If the first case had only one ohm resistance to overcome, then he would get ten amperes of current because it only takes one volt pressure to overcome one ohm of resistance, and the equation would read one volt pressure times ten amperes current=ten watts.

On the other hand we will suppose the next case had ten ohms resistance. It would then take ten volts pressure to overcome the resistance and the result would be that the patient would only get one ampere of current. The wattage would in this case be the result of ten volts times one ampere or ten as per the first example.



Cells in series *Fig. 2* *Cells in parallel*

If we connect three dry cells in series with one another, the combined output of the three cells equals the amperage of but one cell, but the voltage of all three cells. If, on the other hand, we connect the three cells in parallel, the combined output of the three cells is equal to the voltage of but one cell and the amperage of all three.

Electricity is produced in two ways. First by chemical and second mechanical. The first is represented by the battery, the second by the old static machines and the dynamo or generator. Galvani was the first to note the direct or continuous current. Volta was the first to put it into actual use. He found that if he placed a piece of copper and zinc in an exciting fluid and then connected the two together by means of copper wire or other good conducting material that an electrical current was established which has been termed the Direct, Continuous or Galvanic Current. We represent it graphically as follows: The straight line is the Zero line—The current above the positive side; the current below the negative. Each little mark at the side we consider as milliamperes. See Fig. 3.

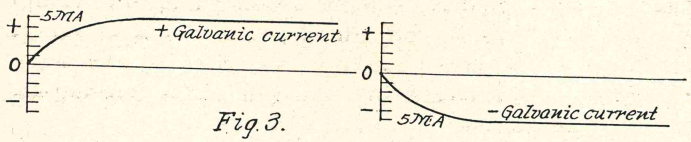


Fig. 3.

By means of a rapidly revolving armature of a generator we can also produce a continuous current, and while it is not from a scientific standpoint as good as the battery, still for therapeutical purposes it is far superior. In the first place the battery is always running down when you need it the most. On the other hand the current from the dynamo is not so hot, i. e., you can run up a higher milliamperage with the generator than you can with the battery. My explanation for this is that the generator is built specially to deliver a high voltage current with the highest limit of about one ampere. With the battery in order to have sufficient cells to insure sufficient voltage to overcome the body resistance, we have in this battery a very large amount of amperage, and while applying the current we are using only a small quantity still there must be some quantity pressure behind, which makes the current much warmer.

The galvanic current has properties which make it distinctive from all other currents. It has the power of splitting up chemical substances into their elements. This property is called electrolysis.

However one very important thing to remember is that the electrolyte (substance through which the current is acting) must be liquid or at least semi-liquid. To explain. If we place the two poles of the galvanic current in a glass of water, the water (H_2O) is split into its elements—hydrogen and oxygen. The oxygen seeks the positive pole and the hydrogen the negative pole. If now we place these two poles in a piece of ice no electrolysis will be noted.

This is a point to remember—*DON'T EXPECT TO OBTAIN CHEMICAL CHANGES IN BONE TISSUE.* You may possibly produce a slight amount along the course of the blood vessels and lymphatics, etc., but as far as the bone is concerned you will not affect it. Therefore remember that osteo-myelitis, etc., will not be benefited by the galvanic current.

The various chemical elements have one of two actions: they are either electro-positive in character or electro negative. If they are electro-positive they will be repelled by the positive pole and tend to collect on the negative, and if electro-negative, the reverse. We take advantage of this property, and often put remedies we wish to carry into the tissues, on the various poles. If for instance we want to put copper into the tissues we would apply it with the positive pole. Copper is electro-positive and, according to the law—"Likes repel and unlikes attract," it will be repelled from that pole toward the negative and thus driven into the tissues.

The various metals are practically all electro-positive. The hallogens (iodine, chlorine,bromine and fluorine) and also oxygen are electro-negative and must be applied by the negative pole. As a rule it may be considered that the acid radical is electro-negative, while the base is electro·

positive. For example, Cocaine hydrocloride; the cocaine is electro-positive and will be repelled by the positive pole, therefore should be applied by that pole. Soda salicylate the salicylate radical is what we are after; it is electro-negative and should be applied by the negative pole.

There are other peculiarities of the galvanic current which can be more concisely expressed in the following way. But before doing so I wish to lay emphasis upon this point; that the galvanic is the only current with which we consider the poles. For some reason this is hard to understand. Doctors continuously ask me which pole I use, when speaking of the sinusoidal and high frequencies. When speaking of these currents we should not use the expression poles but should say terminals. However if you hear or read something in regard to attaching one pole to this and the other to that, it does not mean anything unless they are speaking of the galvanic or direct current.

The following is a classification of the action of the two poles of the galvanic current:

POSITIVE

1. Acid Pole.
2. Vaso-constrictor.
3. Stops hemorrhage.
4. Contracts and hardens tissue.
5. Sedative.
6. Decreases active inflammation.
7. Dries or dehydrates tissue.
8. Copper, zinc, iron and other metals are applied at this pole.

NEGATIVE

1. Alkaline pole.
2. Vaso-dilator.
3. Increases hemorrhage.
5. Relaxes and softens tissue.
5. Irritates.
6. Increases inflammation.
7. Increases moisture.
8. Hallogens such as iodine, clorine at this pole. Also salycilates.

The process mentioned by which chemical elements are driven into the tissues for medicinal action is called Phoresis. Anaphoresis meaning when the anode is used; Cataphoresis,

when the cathode is used. However in order to simplify the process, the term Cataphoresis is employed universally for either.

Going over the actions of the different poles you can at once see that we can stimulate, we can increase temperature, but the whole process is entirely one of chemical change produced by electrolysis. The thermal and mechanical changes produced are so far inferior to the high frequencies and sinusoidals that we should not use the galvanic for any other action excepting for actual gross chemical and polar action.

MECHANICAL CURRENTS

Magnetic Energy—Not much has been done with this energy in a therapeutical way, for we have not sufficient instruments to measure it. Truly we have the compass but that only tells us that it exists. We do not know its nature or what its field of action is. It is unquestionably electrical in nature and knows no insulators nor conductors although it does have affinity for certain metals.

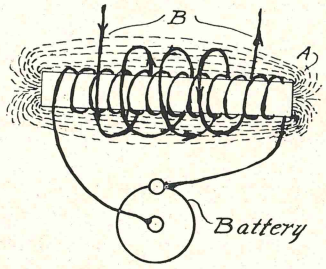
Its greatest value lies in the fact that by it we are able to produce our induced currents, such as the faradic but more particularily the high frequencies. It is also the great factor in motors and motor generators, etc.

The Faradic is an induced current first produced by Faraday from whom it was named. It is not used to a great extent for other currents have been found which are better, so the explanation of it will be very brief.

We have three kinds of magnets: the lodestone, the permanent steel magnet, and the electro-magnet.

If a bar of soft iron is wound with several turns of copper wire and the two ends are connected to a galvanic battery the iron will be instantly magnetized, but will lose it as soon as the current is switched off. Faraday then figured that if the electrical current or field around the wire (induced field) could be converted into magnetic

energy, then magnetic energy could be converted into electrical energy. So he placed around this electro-magnet another coil of wire, but completely insulated and in no ways connected with the first coil (electro-magnet). He found that a current was set up in this secondary coil which traveled one way when he made contact, but immediately travelled in the other way when the current was broken in the primary (electro-magnet). He also found that the more turns he had in the secondary the stronger was the irritation produced by the current. He thus demonstrated that, by cutting the lines of magnetic energy (see cut) at



Primary coil or electro-magnet. Wire cutting magnetic lines(A) at right angle produces flow of electricity in wire one way(B) when current in primary is made. It then travels in opposite direction when current is broken.

Fig. 4

right angles, the resistance offered by the wire converted the magnetic energy into electrical energy. Upon this experiment was developed the Faradic battery. (See cut and explanation.)

FARADIC BATTERY

C—Bar of soft iron wrapped with copper wire which is connected to the two poles of the Battery "D." This forms the electro-magnet or in the Faradic battery the so called primary coil. "B" is a small iron slug connected to a flexible piece of metal. As the current in the primary magnetizes the soft iron bar, the slug "B" is drawn to it. This breaks contact at "A" and stops the current from going through the primary. The magnetism of the soft iron is instantly discharged and the metal slug is released letting the contact

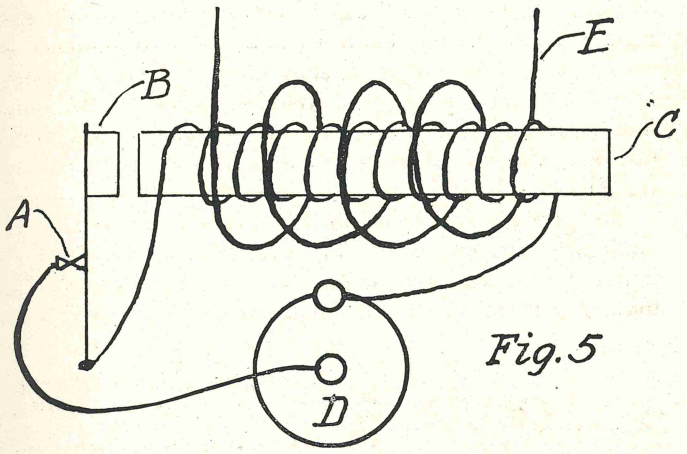


Fig. 5

points "A" come together again, thus repeating the process.

Each time the current is made in the primary coil an induced current is produced in the secondary coil "E" which is wound outside of the primary, and insulated from it. When the current is suddenly broken there is a recoil which sets up a momentary reversal of current.

The rapid alternation of polarity of this current when passed through human tissue produces irritation of the sensory nerves, in fact all tissues, but is perceived by the sensories, for the reason that the tissue can not adjust itself to the change. The effect of this irritation results in stimulation, which is purely mechanical in character.

Why do we say it is purely mechanical? For the reason that the change of polarity is so rapid, there is not time for chemical change to take place, and as a result the irritating effect is all that we get.

On the other hand there is no chance of metabolic effect from an increase in temperature, for the reason that in producing the current, amperage is lost or counteracted by the resistance of the secondary coil, which gives us a

current of fairly high voltage, but low amperage, for the reason that wattage is always the same. Amperage in the galvanic current is that which gives us the heating properties of the current.

We graphically express it according to the same method as the galvanic, only that we speak in terms of voltage rather than amperage, as we have practically no amperage in the Faradic.

The sudden make and break of the current means, when applied therapeutically, that the irritation to the nerve will be sudden, on the other hand, the make and break are not the same. The break of the current (Neiswanger) is about twelve times stronger than the make.

The result is minimum stimulation with maximum irritation; while the sinusoidal currents (which have practically replaced the Faradic), on account of the more gradual onset of the wave, also the uniformity of the wave, produce maximum stimulation with minimum irritation in direct contrast to the Faradic. With the sinusoidal we also have amperage, and with it obtain considerable metabolic effect. Combining these two properties it makes that current far superior to the Faradic.

THE SINUSOIDAL CURRENTS

The origin of the word sinusoidal is from the Greek "sine" or circle. Sinsusoidal means—like a circle.

The current is obtained from the armature of a motor or generator producing an alternating current for the rapid sinusoidal. And from a motor generator, the direct current produced is thrown through a rotor and pole changer producing the slow sinusoidal. I wish you to get the distinction between these two currents. The rapid sinusoidal is a rapidly alternating current. Very much like the commercial AC current only smoother and passed through a transformer to make it ground free (McIntosh Polysine). While the slow sine is a galvanic current thrown into waves by

a rotor and pole changer which makes one alternation positive and the next negative.

An alternating current is any current that alternates. The Faradic is an alternating current.

A sinusoidal current is a current composed of cycles. Each cycle consists of two alternations of exactly the same strength and character with the exception that one wave is negative and the other is positive.

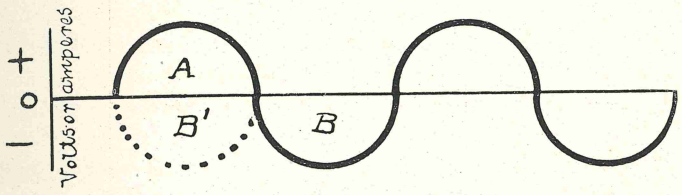


Fig 7-

It is expressed graphically as follows. The curve "A" is the positive alternation, while "B" is the negative. If we could imagine the second alternation drawn backward as the dotted line B^1 we would have a perfect circle or sine.

This current being slower in character is not quite as irritating upon the nervous system as the rapid sinusoidal. It does give or have some chemical effect upon the cell, but is immediately counteracted by the following alternation of opposite polarity, therefore there would be no gross chemical change as with the galvanic.

However it has a marked effect upon cellular metabolism and makes our greatest current in atrophied conditions as will be explained later.

The rapid sinusoidal as stated before, is a modified AC current. It does not have the properties that the slow sinusoidal has. It is a great deal more rapid than the slow sinusoidal. The rate of the sines cannot be controlled as they can in the slow sinusoidal. The latter can be regulated anywhere from ten cycles a minute up to 170

on the McIntosh Polysine. However by breaking the rapid sinusoidal into segments with an interrupter, we can produce a very definite tonic effect, which is especially useful for the nervous system.

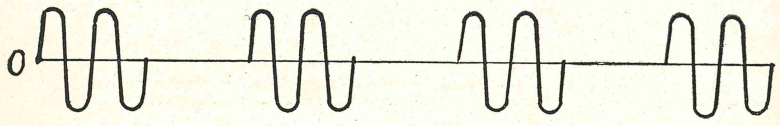
The rapid sinusoidal is expressed as follows:

The speed of the waves, being so rapid, produces considerable irritation on the sensory nervous system and makes of it a powerful agent when we want to affect the nervous system. But according to the law of nature every muscle, nerve or other tissue must have its period of rest before action, otherwise, it will become quickly fatigued. The effect of this current would be then, first, stimulation, soon followed by fatigue.

Many electrotherapeutists use this current continuous for five, ten or fifteen minutes for acute painful irritations, until they have fatigued or, as we say, obtunded the reflex. However, this is, as a rule, not good technic. It is more often followed by a return of the trouble, worse before and in many conditions creates a new pathology, masking the old. It should not be used, for the reason that we have other currents which will produce the same effects that are reconstructive in character, while this method tends to be destructive.

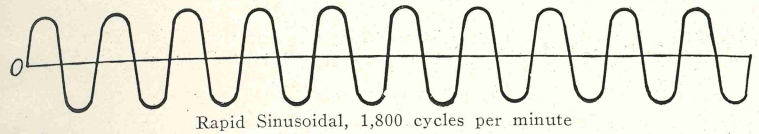
About the only use I make of the continuous rapid sinusoidal is for Electro-spinal diagnosis.

If however we split the current up into segments with an interrupter, we have one of the finest currents of all the sinusoidals, particularly where we want to regenerate nerve functions. This current is called the Interrupted Rapid Sinusoidal and is expressed as follows:

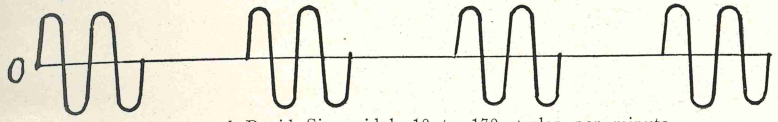


My classification of the sinusoidals according to their mode of production—namely the Galvanic sinusoidals and the A-C Sinusoidals—I find a very good way to keep them clear in the mind, as the action of the different currents of each group are similar. They are as follows:

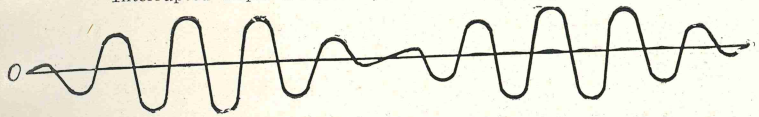
A. C. SINUSOIDALS



Rapid Sinusoidal, 1,800 cycles per minute

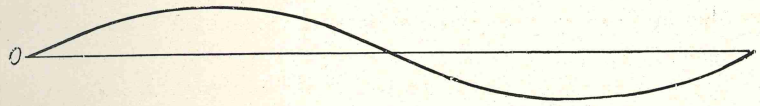


Interrupted Rapid Sinusoidal, 10 to 170 cycles per minute

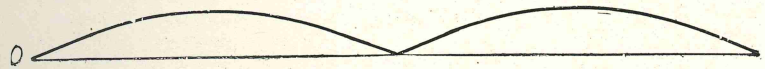


Surging Sinusoidal, 20 to 380 cycles per minute

GALVANIC SINUSOIDALS

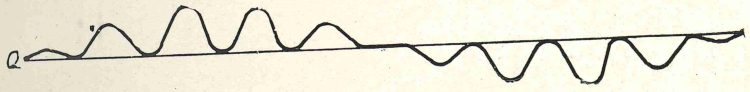


Slow Sinusoidal, 10 to 170 cycles per minute

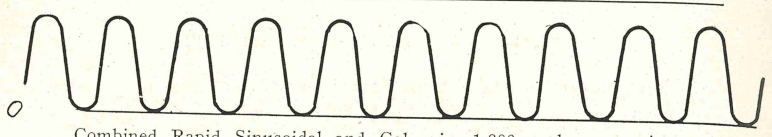


Surging Galvanic, 20 to 380 cycles per minute

OTHER FORMS OF SINUSOIDAL



Superimposed wave which is the combined sinusoidal and galvanic sent through the rotor, 10 to 170 cycles per minute is the most stimulating of all and is seldom used.



Combined Rapid Sinusoidal and Galvanic, 1,800 cycles per minute, is mentioned to be condemned. It is like applying heat and cold together. The effect of one current counterbalances the other. It has a fatiguing effect much like the continuous rapid sine.

The prime use of the sinusoidals then is for massage or mechanical action. The rapid sinusoidal or AC group are indicated more where you want to affect the nerve control. They are also better than the slow sine waves to massage adhesions, deposits, etc., because the rapidity of the wave vibrations tends to break them up better.

The slow sinusoidal group is indicated where tonic action is required to build up muscular or secretory function, as for example a wasted muscle or a diseased prostate with poor secretion.

When massaging the deeper structures for purely mechanical action, as for instance, abdominal adhesions, the interrupted rapid sinusoidal would do the work, but, however, on account of the abrupt onset of the current, is more shocking and does not allow you to give sufficiently strong doses. In this case the surging sinusoidal is better because the current starts gradually from zero up to the full strength of the wave and then down to zero again, thus avoiding the shocking effect; this allows you to use anywhere from ten to twenty volts more than using the interrupted sine. While the interrupted sine can be used just as satisfactorily in most cases; however for the sake of keeping the currents systematized I use the surging sinusoidal in all cases when I wish the pure mechanical action, that is, am not after tonic effects.

The surging galvanic is seldom used. Its action is about the same as the slow sinusoidal, with this exception—it is a one way current and allows you to obtain some galvanic that is chemical and some polar action. About the only place I use it is in the atrophied testicle and the epididymis.

HIGH FREQUENCY CURRENTS

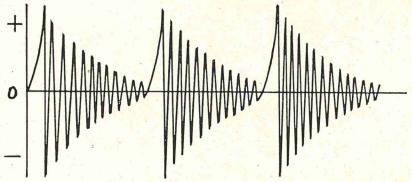
The physics of the high frequency currents, their origin and development, etc., would fill several large volumes, so I will omit all, with the exception of sufficient to give you the basic functions of the different currents, for that is all, we, as physicians are interested in.

The high frequency currents originate in the discharge of a high voltage current from the plates of a condenser. To be more explicit they are what we call oscillating currents.

After much experiment it has been found that the best results are had by means of the so called closed core transformer, in which instead of an open iron core (electro-magnet), a square of soft iron is used. On one side a few turns of coarse wire is wound; on the other side a fine wire of many turns is wound. This coil is the secondary. The primary is connected to the ordinary alternating or commercial A-C current. If you have direct current, you will have to have a rotary converter to develop an A-C current. The result of the current from this transformer is a tremendously increased voltage. The current coming from the ordinary transformer connected to the 110 volt A-C current is somewhere around 35,000 volts.

However, the frequency or number of alternations per minute are not increased. To step these up, the following procedure is used. The current from the transformer is led into a condenser which is an apparatus consisting of first a plate of conducting material and then one of insulation, etc. The result is that when the current passing through the plate of good conduction comes against the plate of insulation, it is momentarily stopped or checked. This allows accumulation of the current. If we lead this current to a spark gap the following results—as the current suddenly discharges through the gap, the full force of the condenser is discharged. Apparently there is only a series

of sparks, while the truth is, each spark is followed by a tremendous amount of recoil waves. Very much like when you drop a stone in water there is a big splash followed by a large number of smaller waves, which rapidly spread out from the spot where the stone was dropped. These waves are called oscillations, and the result is that we have a current increased tremendously in frequency. It is graphically expressed as follows:



The large wave represents each time the condenser is discharged.

D'Arsonval now found that if he placed a coil of wire into the circuit he could step the voltage down and get more amperage and still maintain the high frequency current. This is called the D'Arsonval Solenoid.

On the Hogan High Frequency Apparatus the voltage of this current is between 10,000 and 12,000. It is the current used when giving diathermy and auto condensation, particularly where more heat is required.

The Tesla coil was originated by Tesla, who conceived the idea that if he placed a secondary coil around the D'Arsonval coil he would get a very high voltage high frequency current.

On the Hogan High Frequency Apparatus the voltage of this current is 25 to 30 thousand. It may also be used for auto-condensation and diathermia, but has a field of action entirely different to that of the D'Arsonval coil.

In studying high frequency currents, it has been found that to produce the highest frequencies for the secondary coil the primary and secondary should be in resonance. Oudin found that by using the primary coil as one of a very few turns of very coarse wire and a secondary coil of

large number of turns of very fine wire a current was produced which has almost double the voltage and frequency of the Tesla coil. In order to tune these coils together a certain number of turns of the coarse coil must be used in conjunction with the fine secondary coil, depending upon the amount of current passing through the circuit. This is regulated by a handle on the coarsest coil. The voltage of this current is about 60,000 on the Hogan High Frequency. The amperage is cut down so much that there is very little heating properties connected with it.

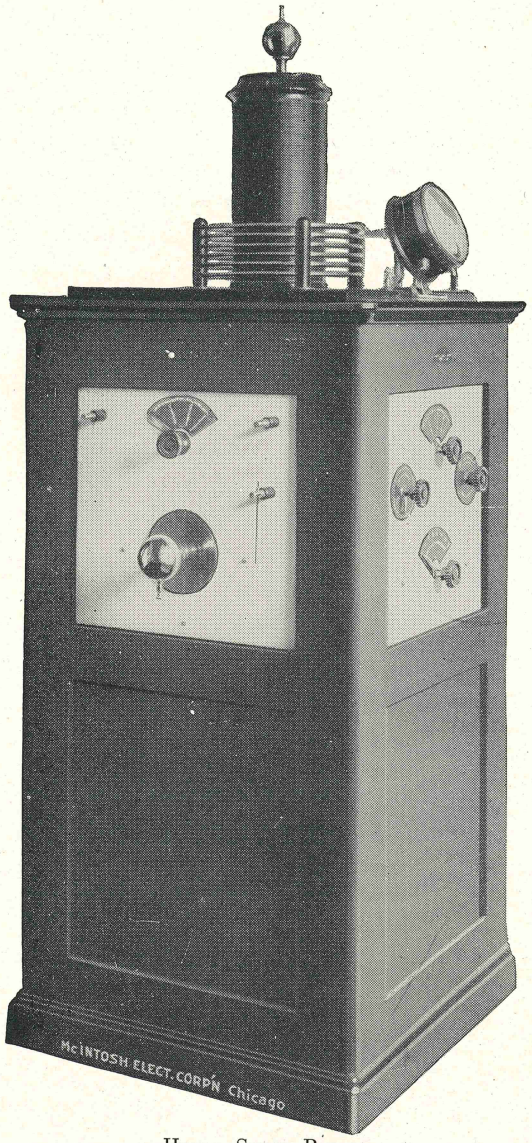
It is used for desiccation in tonsil work, the so-called cold method. I have not used it sufficiently to give it a real definite field of action. In fact where I want the high voltage in preference to the amperage I have found the Tesla coil to so satisfactorily fill the bill that there is no call for the Oudin resonator.

When an alternating current has reached the speed of 10,000 or more per minute, it is then too rapid for the sensory nervous system. So we arbitrarily take this point as the dividing line between the high frequency and low tension currents.

The action of these currents depends entirely upon the speed at which they travel through the tissues. The friction from their passage produces heat, which is the prime action from the currents.

The D'Arsonval coil being of lower voltage has more current and the result is that we get more heat. However it does not have the speed of the Tesla, because the voltage is so much less and as a result, it would not be indicated in the more active conditions requiring less heat, but more effect upon the nervous system.

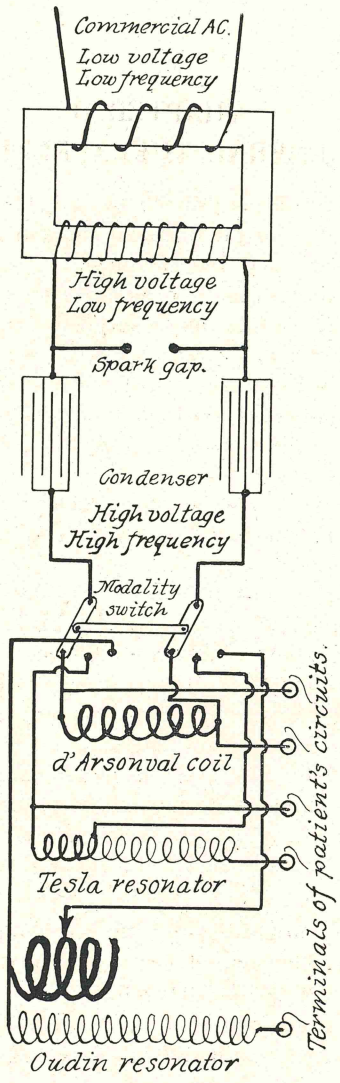
Comparing the different currents, we see that there is a definite field of action for all of them, and that all of the fields of the currents overlap. That is, one current can be made in an inferior sort of way to perform the duties of the other. Again let me warn you of the danger of using



Hogan Super Power
High Frequency Apparatus

the currents in this way. Select the galvanic when you want chemical or polar, the high frequencies when you want thermal and the sinusoidal when you want mechanical or tonic effects. Make your diagnoses along this line, and combine your currents, i. e. in sequence when so indicated.

The following diagram is of the high frequency currents.



CHAPTER II
GENERAL THERAPEUTICS

Indications and Contra-indications.

The indications for the different currents have been given —mechanical, thermal and chemical.

The contra-indications are as follows: All active confined pus cases should have surgical drainage instituted before any electrical current is used. Later on a special electrical test will be mentioned which will enable you to definitely diagnose the existence of active confined pus, as for instance a pus appendix, pus tube, mastoid abscess, mediastinal abscess, etc.

Diathermia is usually counter-indicated in active inflammations with high fever. There are a few exceptions as, for example, pneumonia.

The D'Arsonval current usually irritates conditions characterized by irritated nerve reflexes, while the Tesla coil or current usually has a sedative influence. However when using this current for these conditions, care must be taken that the spark is tuned right and passing smoothly, otherwise irritation is liable to result.

The sinusoidal currents are as a rule counter-indicated in all acute and many sub-acute inflammations.

The galvanic current, the Tesla current and the rays of the 1500 watt incandescent light are our best weapons for acute diseases.

Do not apply any of the currents mechanically. Use your brain. Apply them definitely for a definite purpose.

Proper Combination of Currents.

Again I must say the only rule we can give is a general one; reason has to be used with every case.

Supposing you were treating a case of abdominal adhesions. You would want to soften up those adhesions before you massage them in the attempt to break up and absorb them, therefore you would use diathermia first and follow it with the surging sinusoidal. If you used the sinusoidal first and then the diathermia you would not get results.

Supposing you had a relaxed boggy uterus, you would not want to relax it more with diathermia. You would have to contract it with positive galvanism and follow this with the interrupted rapid sinusoidal for tonic effect.

When treating a given condition treat the inflammation first and the tone last. You would'nt give a tonic to a patient with an active grippe; but after active symptoms have subsided you would then use your tonic.

Galvanism.

Is indicated in practically all acute diseases (positive galvanism). It is indicated in local inflammations with infection, either acute or chronic. Test the reactions of the diseased area with litmus paper, and apply the proper pole to overcome this condition. When you have restored the reaction to an approximate neutral, nature will take care of the balance herself. Don't expect to do this with the high frequency currents. They will increase chemical action but they won't change the reaction.

Cataphoresis.

Using medicines with the galvanic. Always combine the remedy with the polar action of the current as the disease indicates. To explain—supposing you had an old chronic gonorrhea—copper of course is germicidal. But the tissues are subnormal in activity, and if we would use the positive pole, which would be necessary if we wanted to use copper, we would only sedate the condition that much more. If we would use the negative pole, which is stimulating, the local vitality and circulation would be increased,

and we could use iodine cataphorically, which is almost as germicidal as copper.

Electrolysis.

Is the ability of the galvanic current to split chemical compounds into their elements. All galvanic action is an electrolytic one. However we generally speak of it or consider it from the destructive view-point as in epilation, where we use the negative pole to destroy the hair follicles in the treatment of superfluous hair. Or in cases of urethral caruncle, with the positive pole we destroy and shrink up the caruncle.

Faradism.

Purely for stimulation or tonic effect. It is inferior to the sinusoidal currents in many ways, and is almost obsolete. It is still used by many after diathermia, and also in the treatment of paralysis. However, the rapid sinusoidal is the better current.

Sinusoidalism.

In all conditions where you want mechanical action and tonic effects. Mechanical action does not necessarily mean adhesions, infiltrations, etc., but is just as valuable to increase circulatory and lymphatic drainage.

The slow sine is more valuable to build up atrophied conditions, either structural or secretory while the rapid sinusoidal (interrupted) is better for nerve tone.

Diathermia.

The D'Arsonval current where you want greater heating properties and have not the nervous reflexes to deal with. The Tesla current where less heating is required but more sedative effects are desired. For example high-blood-pressure in a young person which is toxic in origin accompanied with congestive headaches or other nervous phenomena will respond better to the Tesla; while a case in an old person with athereomatous changes of the blood vessels, pipe stem

arteries, etc., requires more heating properties and would respond better to the D'Arsonval current. Apply this principle to all cases where the high frequency current is to be used.

When in doubt use clinical thermometer. If the temperature under the tongue is sub-normal as a rule, that case will be benefitted by auto-condensation. If the vagina is sub-normal local diathermia will be indicated. There are, of course, exceptions to all rules.

Get this distinction—Auto-condensation is for general heating effects, while diathermia is for local conditions, regardless of which current you use, that is Tesla or D'Arsonval.

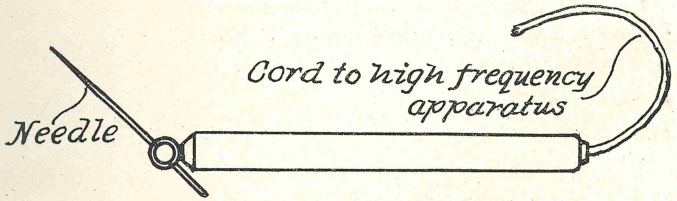
Fulguration.

Is a destructive method of treatment for small growths such as papillomas, adenomas, warts, etc. It is applied with the Tesla or Oudin currents. Is unipolar, i. e., only one pole is used. There are two methods, the direct and indirect. In the direct the current is delivered directly to the patient from a sharp pointed probe. With the indirect the current is connected to a large electrode and the current is drawn out of the patient by the operator holding any ordinary probe in his hand, the operator acts as a partial ground. This latter method I prefer, for the reason that I can control the current by placing my free hand in contact with the patient's skin. Now by lifting up one, two, three or more fingers, I can control the amount of current coming through the probe, while with the direct method the only way you can control the current is by regulating the amount of current delivered from the high frequency apparatus; even in the smallest amount it is rather sharp and irritates the patient much more than the indirect method.

Electro-Coagulation.

Is a destructive method of treatment with the D'Arsonval current used bi-polar instead of uni-polar. It is very power-

ful and should always be used with local or general anaesthesia as the case indicates. A piece of block tin is attached to one terminal of the D'Arsonval (diathermy) current and fastened properly to the patient. Be sure that it is applied in good contact and bound by bandages, straps, etc., so that it will stay in place, otherwise a burn may occur as the patient may be anaesthetised and not be able to inform you that it is burning. Now connect the other terminal of the current to a suitable handle (see cut —) in which



Coagulation handle.

is inserted a sharp pointed probe, cambric needle, etc. This is plunged into the area to be treated and the current turned on by means of a foot switch until the area turns white. Some practical experience will be required in order to gauge the amount of coagulation desired. Now remove needle and insert at another point and repeat until the whole area is coagulated.

Electro-coagulation is used where extensive destruction is required as carcinoma of the tongue or uterus, etc., etc.

Indirect Diathermia.

I almost always employ the Tesla current when using indirect diathermia, because if the part to be treated requires extensive heating the D'Arsonval current, bi-polar, is best.

Technic can be best explained by citing a case or two. Supposing a case presents himself who is suffering from a brachial neuritis. I would connect a piece of block tin to the active terminal of the Tesla current and place it in a pan of water. Then put a towel in the water over the

block tin and have the patient immerse the hand of the affected side in the water. With my fingers I would then go along the course of the brachial nerve, beginning at the spine and paying more attention to the spots most tender along the course. If one finger produced too much heat I would use two or three according to the sensations of the patient. I would treat him until he could move the arm in all directions free of pain, regardless of time. It might take five minutes in one and an hour in the next.

I would repeat the treatment on the first sign of return, i. e., instruct the patient to return for another treatment at the first sign of return of the pain. It might be in the afternoon of the same day or it might be two or three days afterward. Usually for these neuralgia and neuritis cases, two to four treatments will suffice. Of course if the history points to a chronic brachial or sciatic involvement, then we could be sure of adhesions, thickening of the nerve sheath, etc., and a different line of treatment would be required, which in case of the patient just mentioned, would be D'Arsonval diathermia throughout the course of the nerve followed by a few minutes of the surging sinusoidal, to massage and break up adhesions, etc. But, however, the acute irritation would have to be first relieved by the Tesla indirect method.

So you see everything depends upon making the proper diagnosis.

Auto-Condensation.

When applying the D'Arsonval current for the general systemic effect where I want more heating I use the bi-polar method. Placing my patient on the auto-condensation couch and connecting one terminal of the D'Arsonval to it and the other terminal to the auto-condensation handle, which is grasped by both hands. Place a pillow on the patient's abdomen to rest the hands on so that no jump sparks will fly from the patient's hands to his body. See

that no cords come in contact with the patient or with each other as the high frequency current knows no insulators. Start the current gradually. First about 300 ma., then slowly increase to 800 or 1,000. Treat fifteen minutes to an hour depending upon the severity of the case and the result produced by previous treatments. Do not increase the strength of the current. Increase the length of application.

When I use Tesla auto-condensation, I place the patient on the auto-condensation pad or couch connected to the active terminal of the Tesla coil and turn on a sufficiently strong current, which on the Hogan High Frequency is usually the fourth or fifth button of the rheostat, I then draw the current out of the patient with my fingers over the site of irritation. Supposing we had a case of high-blood-pressure with congestive headache — I would draw the current out through the head at the points of irritation, or if the pain was in the back I would lay him face down on the couch and draw the current out of the back, using one, two or three fingers gently massaging over the area of irritation. I generally treat theses cases until they experience relief which may be fifteen minutes or may be half an hour. At the same time I employ the 1,500 watt incandescent light which increases skin elimination.

Auto-condensation causes an increase in the elimination of urea, uric acid, carbon-dioxide, and other poisonous waste products. It increases body chemistry and metabolism.

Diathermia does the same thing locally that auto-condensation does generally.

The sinusoidal hastens absorption or removal of waste products, purely by mechanical action. It is almost invariably a good follow-up treatment to diathermia and galvanism, particularly in chronic effections.

Galvanism stands in a class by itself. With it we aim to correct improper chemistry employing the proper pole. Treatment is usually given until reaction to litmus is prac-

tically neutral, nature will then restore the balance. Or, where we want polar action. Many cases, of course, can not be tested for reaction, in which case we depend upon other signs of restoration to normal.

Keep the currents in their proper place. Do not use them out of their distinct field. Constantly remember the three prime actions of the currents. If you are not getting results re-examine your patient.

TECHNIC OF APPLICATION

When using high frequency, metal electrodes of proper size are best. Be sure that exact application is made. Always clean the parts to be treated with soap to remove fat and grease which is a non-conductor and causes jump sparks. Clean the electrodes, brighten up all corroded spots. Block tin or other pliable metal is better for the skin. Heavy tin foil should be used around joints and places where the block tin doesn't mold so well.

The galvanic is just the opposite. Never have bare metal in contact either with mucous or skin surfaces. Burns, or at least irritation, will result, sticking of the electrodes, etc.

The sinusoidals depend upon whether you are using the "AC" sinusoidals or the galvanic sinusoidals. Either method is all right for the former, while the latter must always follow the rule of the galvanic, i. e., covered electrodes.

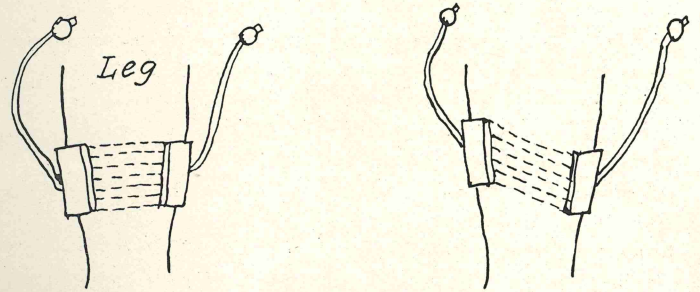
SIZE OF ELECTRODES

The active electrode is always the smallest electrode because the current from that electrode is concentrated. The active electrode should be applied in as close contact with the diseased area as is possible. A good rule to follow is to select the size a little smaller than the area to be treated as the current always spreads.

Wherever possible try to make both electrodes work. It is better technic. For example, supposing you are treating the stomach. Place the active electrode over the

stomach and the back electrode over the spine at the fifth dorsal vertebra which is the spinal center to the stomach. Consult Dr. Charles Ireland's chart of Abram's spinal reflexes. It may be procured direct from Dr. Ireland of Columbus, or from McIntosh Electrical Corporation.

When using diathermia always apply the electrodes so that the current is passing directly at right angles from one electrode to the other. Never obliquely. See example below.



Right way *Wrong way*

The reason for this is that exact dosage can not be gauged. Results can be obtained, but I am a crank on exactness for that always means better technic. You are more definite, and the more definite you are, the more scientific you are and definiteness always produces the largest per cent of good results.

The heating point between the two electrodes is always the greatest where the diagonals from the edges of the electrodes intersect. If two electrodes are of the same size then the point of greatest heating would be exactly half way between. If one was a third smaller, the greatest heating point would be one-third the distance closer to the smaller electrode. This rule applies up to the point where one electrode is a point which would be the point of greatest heating.

And explains why a small probe from one terminal is used for destructive treatment. See cut.

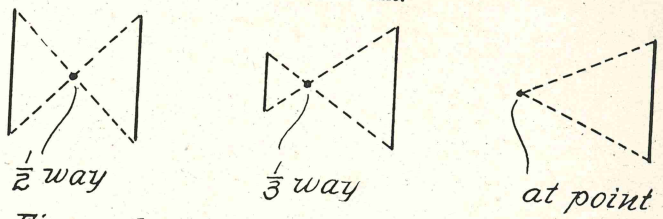


Figure depth of area to be treated and select electrode to approximate that depth

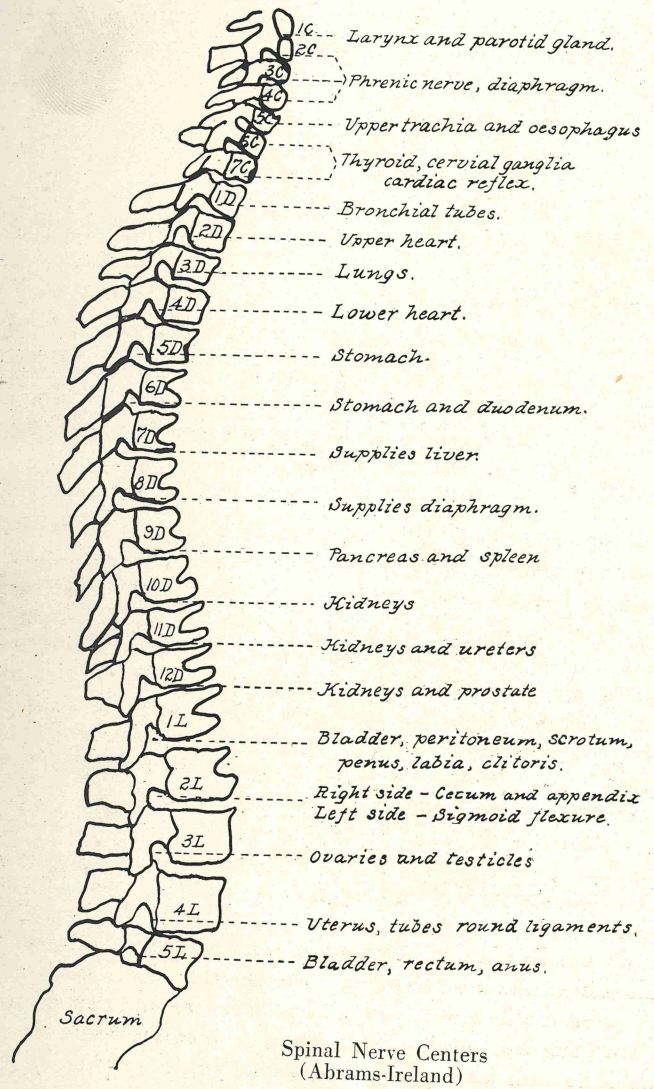
Do not use large pads. I seldom use any pad larger than three by five inches with either the galvanic or sinusoidal currents. My active pad is usually smaller than this, depending upon the area treated.

Dosage

High frequency rule is, never give more than 100 ma. per square inch of the active electrode. I, as a rule, never use more than three-fourths of this amount. If the active electrode was four by four inches, the limit would be 1,600 ma. I would never use over 1,200. Or, if the active electrode was two inches square the limit would be 400 ma. and I would never use over 300. I would begin treatment by giving them one-third the amount for three or four minutes, then one-half for three or four minutes, then three-fourths for the balance of the treatment. I would never increase this amount but would increase the length of application, which, of course, would depend upon the nature of the trouble as well as the results obtained from previous treatments.

No matter what electrical current you are using, give the smallest amount possible to produce the desired results.

Repeat the treatment often when you are using reconstructive treatment. Every day, if possible, until definite results are obtained and then less often.



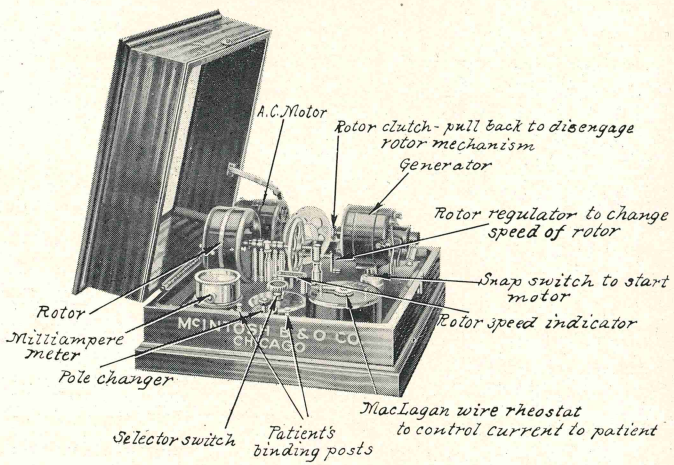
Spinal Nerve Centers
(Abrams-Ireland)

When applying destructive treatment do not repeat until the effects of the previous treatment are gone, which varies from three days to two weeks.

POLYSINE GENERATOR
(McIntosh)

The Polysine is, as far as I know, the best low-tension apparatus on the market, on account of its wide range of modalities, smoothness of currents, ease of operation. It requires very little attention, works almost 100 per cent of the time, and above all is ground free, so that you are not shocking yourself or patients, if you accidently touch a water pipe or other ground.

A drop or two of oil in four holes once a week and a



little vaseline in four cups once every two months is about all the attention it requires. The selector switch and pole changer are improvements of immense value. You do not have to bother about changing cords, etc., all you have to do is to turn a couple of knobs and you can instantly get

any current you want and deliver either pole you desire to either cord from the patient.

The directions for operation are very simple. Place the electrodes in place, connect the cords and run them to the binding posts of the Polysine. Turn the selector switch to the current you want to use. If it is the galvanic current, see that the pole changer is fixed so that you are delivering the proper poles to the proper cords. Now see that the handle of the rheostat, or controller, is at point marked off. Connect the lead in cords from the commercial current to the posts at the back of the machine. Turn on the current at the light socket and then turn on the current to the Polysine with the regular switch (see diagram). When using the galvanic current always pull the friction clutch cone back which releases the rotory. There are two reasons for this—first, possible leakage of a small amount of the sinusoidal, and second, a great saving on the machinery.

THE HOGAN HIGH FREQUENCY
(McIntosh)

When buying a high frequency apparatus be sure that you have one that has an ample condensor. Be sure that you have one with a fool proof spark gap, one that will work all the time. And, also, be sure the machine has separate coils for each current. Some apparatus take their D'Arsonval current off the primary of the Tesla in which case there is a lot of wasted current.

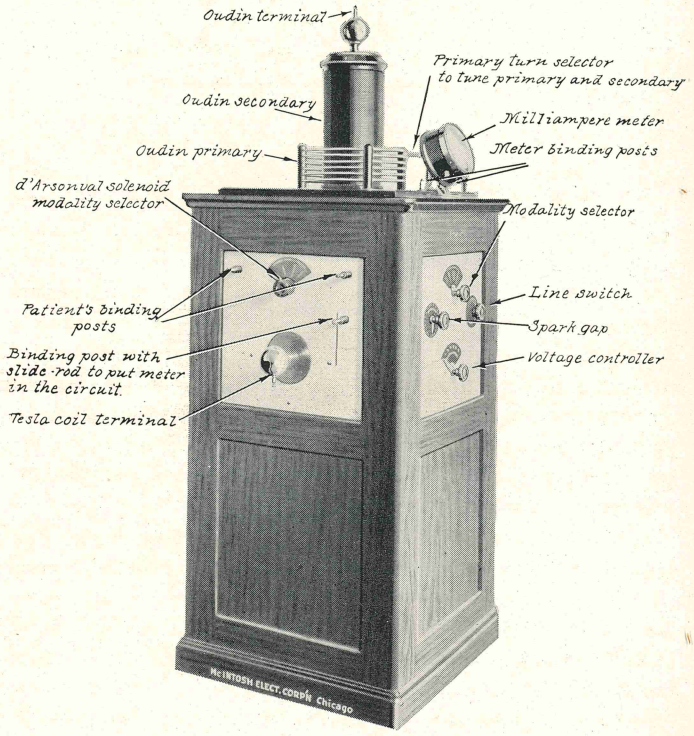
The new Hogan High Frequency apparatus with the improved spark gap is one of the finest and most efficient machines on the market. It is priced within the reach of all.

I use both the Polysine and the Hogan and know that they deliver the goods. I am not writing this with the idea of boosting these apparatti in particular. But I am anxious that my students have efficient apparatus. There are others on the market that probably fill the bill very

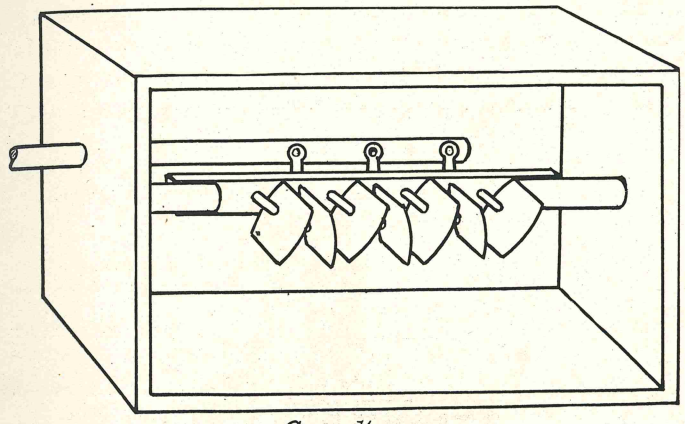
nicely. However, there are many that are very inefficient.

Many doctors ask me if this and that machine is good or bad. I can only answer them by repeating what others have told me. I have not had the actual experience.

The following is a diagram of the Hogan High Frequency:



THE SPARK GAP



Spark gap.

In machines built according to older principles the spark gaps are constructed with discs of mica or other insulating materials between the cup-like sections of the spark gap; the sparking being confined within a limited space creating a vacuum and in time puncturing the insulating discs, causing a heavy arc of current and an interruption of service until the disc has been replaced, which often entails considerable work.

In the Hogan Super-Power High Frequency Apparatus, the Spark Gap consists of a series of non-oxidizable metal plates, mounted on a lava base, possessing great heat resisting qualities, permitting adjustment from a minute spark to full capacity. All being contained in a large air chamber lined with mica, amply ventilated so that no gases are created or accumulated to interfere with spark. The durable construction and great care with which it is made, enables the apparatus to be operated for hours with scarcely any attention.

CHAPTER III

EYE, EAR, NOSE AND THROAT

EYE, EAR, NOSE AND THROAT presents a tremendous field for the electro-therapeutist, and why men following this specialty, do not take advantage of it, is a mystery to me. Most of them seem to be content with following the older methods of treatment—perfectly content—with no idea whatever of perfecting their methods and advancing science.

There are many deaf people today going around as deaf as ever, who have spent good money with these men to no results. The average physician, before he starts treating the case, is almost positive he won't succeed and when he occasionally does, he is highly elated and considers the treatment fine until he has treated a dozen more—all failures —after which he throws up his hands and says "nothing can be done." He wouldn't try anything new. I have one very good friend who is an eye, ear, nose and throat specialist, whom I have been trying to get interested in electricity for several years. In spite of the fact that I have called his attention to several cases around town who are hearing fine from electro-therapy after he had miserably failed, he still smiles in a superior way and says he hasn't time for "jugglery."

Eye, ear, nose and throat work is delicate work and instead of following the general rules of dosage, we follow more particularly the sensations of the patient. However, in treatment elsewhere we should always consider the patient's sensations first. Never give a dosage that is irritating to the patient, even if it is in the prescribed limits.

The frequency of treatments is often, but the length of treatment is usually about one-third the time as when applying electricity to other parts of the body. Special electrodes have to be used to conform to the part to be treated.

Catarrhal Deafness

If we could look inside the middle ear in these cases we would find the membranes almost white, numerous adhesions infiltrations, ankylosis of the ossicles, etc.

Our first aim is to increase the temperature, get increased blood supply to the parts and soften the tissues, and then immediately massage to break up and increase absorption.

Negative galvanism can be used, but not nearly as satisfactory as diathermia. I believe the rapid oscillation of the current has considerable good effect in reviving the obtunded auditory nerve as well as actual heating effects.

TECHNIC—Cover the double ear electrode with cotton. Be sure enough is over the point so that the current will not be too intense at that point. Insert in the ear and connect to one terminal of the D'Arsonval coil (diathermy binding posts of the Hogan). Connect the other terminal to the ordinary auto-condensation handle to be held with both hands of the patient. There is an important reason for this and that is that by so doing the current is directed along the course of the eustachian tubes, and as a result you seldom will have to catheterize them. Usually the worse cases will become patulent and respond to the politzer bag in two or three treatments.

Turn the selector switch of the High Frequency apparatus to the D'Arsonval coil, just barely open the spark gap and deliver a current as warm as the patient can stand for five to seven minutes. Immediately disconnect the cords from the High Frequency apparatus and connect them to the Polysine and deliver a surging sinusoidal current comfortably strong for three minutes.

Politzerize these cases before and after treatment. Tabulate the results of treatment. I usually use a coarse watch, the average normal tick of which is about sixty inches. With this watch usually improvement of two to five inches is recorded from each treatment.

Give the treatments every day until the hearing has improved to normal limits or as much as it will improve and then gradually reduce the time to three a week, two a week, and one a week. Examine and treat them every ten days to two weeks for two or three months afterwards in order to be sure the results are permanent.

Practically every single case of simple catarrhal deafness will respond to this treatment in a way satisfactory to both the physician and patient, although by that I do not mean that every case will be restored to normal.

Otosclerosis

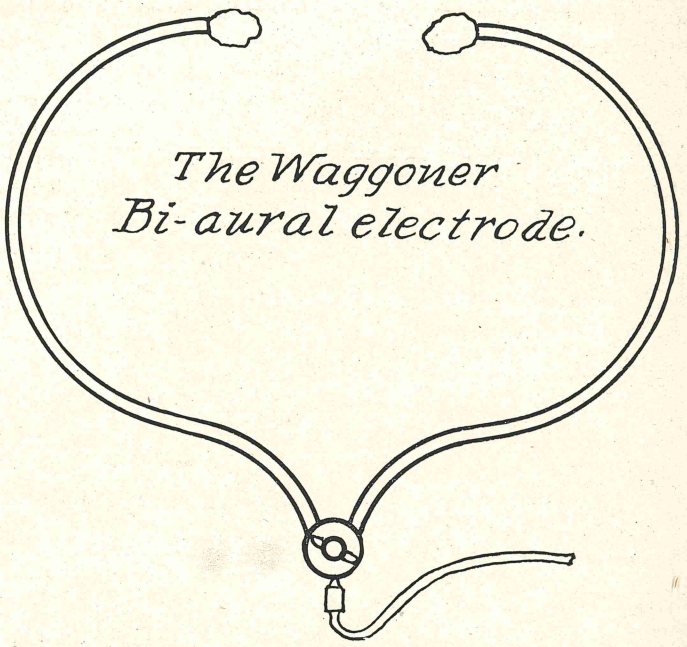
Is in reality an advanced stage of catarrhal deafness characterized by sclerosis and calcareous deposits. Very good results will be obtained in the majority of these cases by the same method of treatment, but it must be persisted in for a year or more.

Internal Ear Deafness

Usually when this condition exists you will also find more or less middle ear deafness, so the same technic is followed as for that condition with the exception that instead of using the D'Arsonval current, I use the Tesla, connecting one terminal to the ear electrode and the other to the hand electrode. It is impossible to prognose what results will be obtained from treatment. I usually treat them for three weeks and if I do not see some signs of improvement in that time, consider the case one that will not respond. My reasons for using the Tesla coil are that it has better effect upon the auditory nerve than the D'Arsonval on account of the higher voltage and thus greater speed of the current.

The following diagram demonstrates the method of application:

D'Arsonval Diathermy with Waggoner's Bi-Aural Electrode in Catarrhal Deafness



Note Pledget of Cotton Fixed on Screw Points

Simple Chronic Rhinitis With Tumefaction

This condition will respond very nicely to a combined galvanic and cataphoric treatment.

Our main object in this condition is to shrink the dilated blood vessels. The positive pole of the galvanic current is a vaso-constrictor. It will also drive adrenalin into the tissues by cataphoresis, which is also a vaso-constrictor. However, we must not use the remedy strong, or the current strong, otherwise the treatment will be followed by a reaction which will leave the condition as bad as ever.

Take the ordinary terminal of one of the connecting cords (see cut) and cover with cotton and then soak in a

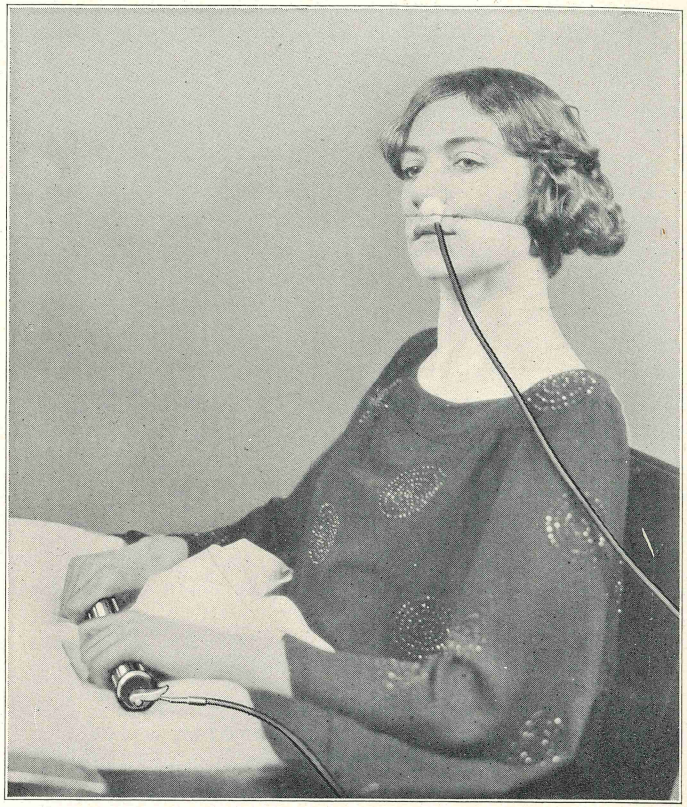
1 to 10,000 solution of adrenalin chloride, squeeze out excess. Insert well up into the nose. Connect this to one of the binding posts of the Polysine. Connect the other cord to binding post of Polysine and the other end to a well moistened three by five pad placed on the chest in the mid-line. Turn the pole changer so that the positive pole is delivered to the nose and the negative to the pad on chest. Turn selection switch to galvanic current. Pull back friction gear to release rotor, see that rheostat handle is at point "off" and turn the current on through the switch. Wait until the motor has run a few seconds and then gradually turn current on until three milliamperes is registered on the milliampere meter. Treat for five minutes.

Repeat the treatment every day until the tumescent turbinates are normal. Then test the secretions with litmus. If they are markedly acid give three or four treatments of mild negative galvanism for chemical effect until the secretions are about neutral. If you do not follow this procedure the condition will return very soon.

Chronic Hypertrophic Rhinitis

This condition is characterized by lowered tissue resistance and actual connective tissue infiltration. There are two methods of treatment about equally valuable so I alternate the treatments, i. e., give one, one day and the other the next. It has this value, that it prevents nature from forming a resistance to the currents, which she will do just the same as she will with a drug. A morphine user has to keep taking more and more to obtain the same results.

First, connect up the same as for treating simple chronic rhinitis. Only, instead of using adrenalin, use saline solution. Instead of delivering the positive pole to the nose, deliver the negative. Treat with three milliamperes for five minutes. Then turn the current off at the rheostat and change the selector switch to the surging sinusoidal and give a comfortably strong current for three minutes.



Treatment of Simple Catarrh

The next day I apply the cotton-covered terminal in the nose the same way, but connect the other cord to the auto-condensation handle same as for treatment of deafness. I then connect to the terminals of the D'Arsonval coil of the High Frequency current and deliver a comfortably hot current for five to seven minutes, and then immediately switch the cords to the Polysine and give the surging sinusoidal

current for three minutes the same as when following the galvanic treatment.

In a few days' time, with the average case, you will find that you have converted your case from one of hypertrophy to one of simple rhinitis with tumefaction. Now give a few treatments with positive galvanism for vaso-constrictive effect and wind the case up.

ETHMOIDITIS

Sinusitis

The characteristic symptom of ethmoiditis is a history of sneezing attacks; a patient who easily sneezes, although he does not have a cold. They usually complain of dull pain at root of nose between the eyes.

Best results will be obtained in this condition by using diathermia following the technic described under hypertrophic rhinitis, giving diathermy for five minutes followed by three minutes of the surging sinusoidal. I have tried galvanism with cataphoresis, particularly iodine, but do not find that it gives as good results as the diathermy. This treatment must not be used if the condition is acute with tumefaction and tendency to obstruction to drainage of the pus. In these cases follow the technic for treatment of Frontal Sinusitis.

CATARRH OF ANTRUM OF HIGHMORE

The greatest symptom is dull pain over the antrum. With the following treatment the largest majority will clear up without surgical interference.

Give internally 1/100th grain of bicromate of potash every three hours, well triturated with sugar of milk.

Lay them on the auto-condensation couch, which has been connected to one pole of the Tesla coil. Turn on a medium strong current and draw the current out over the cheek and malar bone, using one, two or three fingers, according to the comfort of the patient. Usually a fifteen-

minute treatment will relieve the ache. Treat every day until all signs and symptoms have vanished.

FRONTAL SINUSITIS

These casses usually suffer untold agony. There is one diagnostic sign, and that is—pressure with the finger on the floor of the sinus just over the eyeball produces considerable pain.

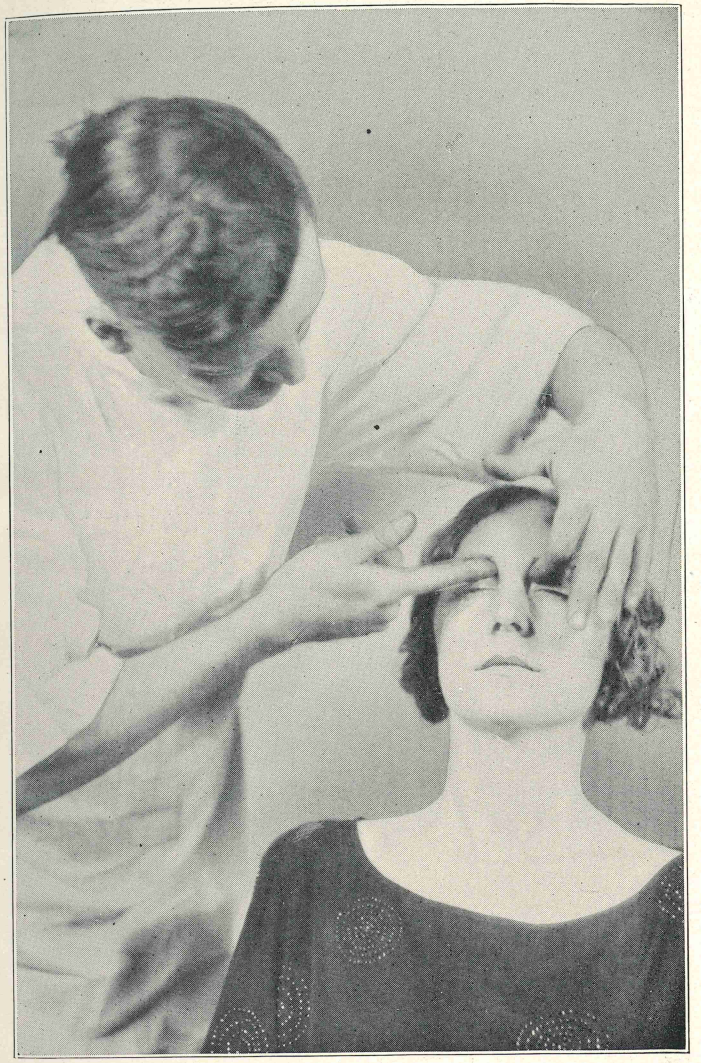
The cause of the pain is usually due to obstruction of the infundibulum or duct, draining the sinus which opens in the middle meatus of the nose.

First, we must open this duct and institute drainage. To do this, cover the terminal of your cord with cotton soaked in a weak adrenalin solution and insert it well up in the middle meatus. Connect to the positive pole of the galvanic current, the negative being attached to a three by five pad on the chest, and give three milliamperes of current for five minutes. Then remove and have the patient take a deep breath, close the other nostril and forcibly breathe through the affected side. The vaso-constrictor action of the positive pole and adrenalin usually opens the duct and the suction caused by the rush of air usually produces a discharge of the sinus, followed by gratifying relief.

For the sinusitis itself use the same technic as when treating the antrum, only, instead of drawing the current out of the antrum draw it out of the sinus, over the eyes and forehead.

SPHENOIDITIS

Same treatment as for ethymoiditis. In all of these chronic sinus cases, I give internally 1-100th grain of bichromate of potash well triturated with sugar of milk, three or four times daily.



Indirect Tesla for Acute Frontal Sinusitis

OZENA OR STINK NOSE

While it is impossible to put new tissue into the human body after it has been destroyed, still it is surprising the amount of regeneration that can be accomplished in these cases.

I give three to five minutes of negative galvanism which increases circulation and secretions and then follow it with three minutes' treatment with the slow sinusoidal, in the attempt to regenerate the atrophied tissue. Practically every case will be markedly benefited. It may not be permanent, that is, the patient may have to return at intervals for a course of a few treatments, but he will be relieved of the distress, and mentally he will be relieved. I have had a good many of these cases say that if they could not get relief they believed they would commit suicide.

The technic is the same as for treating simple catarrh. Connect one terminal to the negative pole in the nose, the other to the positive pole with a pad on the chest. Treat five minutes and follow with a comfortably strong, slow sinusoidal for three to five minutes. Give the sines in rhythm with respiration to produce the best results.

THE EYE

CATARACT

Very good results may be obtained in the way of clearing up cataracts providing they are not too far advanced, by the following technic:

Lay the patient on the auto-condensation couch connected to the D'Arsonval (diathermy) current. Connect the other to an ordinary hand electrode and hold in your hand. Place one finger of the other hand on the closed eye and have your assistant slowly turn the current on to comfortable tolerance. Gently massage, finger over eyeball for ten minutes. Then have assistant disconnect the cords from the high frequency apparatus and connect them to the Polysine and

with the same technic deliver a surging sinusoidal current comfortably strong for the patient.

The value of this method is that in treating such a delicate structure as the eye you want absolute control of the current, which by this method you have; for the minute the patient says the current is too strong all you have to do is put another finger of the treating hand on the forehead and you disperse the current. Also, the sensation of your finger tells you when you are getting a smooth current of the right character.

OPTIC NEURITIS

Calls for the Tesla current. Attach one pole to the auto-condensation couch, and turn on a medium strong current, using the fourth and fifth button of the Hogan High Frequency. Draw the current out of both eyes with your fingers, i. e., the indirect method. Treat ten or fifteen minutes or even longer if results are not produced in a few treatments. For massage effect I use the surging sinusoidal through the nose as per technic already given.

The reason for this I discovered accidentally, while treating a patient for nose trouble. While giving her the sinusoidal she remarked about seeing flashes before her eyes. This led me to use it in chronic atrophy and have found it productive of very good results. When drawing the Tesla current through the eyes, do it more at the angles of the eyes rather than directly through the eyeball. The effect is better.

BLEPHARITIS, CONJUNCTIVITIS, IRITIS, CHORODITIS, RETINITIS, ETC.

The inflammations common to the eye we will take under one head as the treatment for all is the same. That is the Tesla current connected to the pad. Draw the current out of the eyes with the finger, always giving the current com-

fortably warm for the patient. Be sure the spark gap is delivering a smooth and not a jumpy spark.

GRANULATED EYELIDS

You will remember how our forefathers used to treat this condition with the copper pencil. Good results were obtained by it.

By means of the positive pole of the galvanic current and copper cataphoresis, these cases will clear up in three or four treatments.

Technic—Connect the positive pole to one of the small sized uterine electrodes of Neiswanger the negative to a three by five pad placed on any indifferent point, as chest for instance. Evert the eyelid and taking the electrode like a pencil, start gently rubbing it over the granular membrane. Have your assistant gradually turn the current on until about one milliampere registers. This will usually be sufficient for the average case. Contine the treatments until the granules are coated a greenish grey. Repeat the treatment in four or five days.

STENOSIS OF LACHRYMAL DUCT
(Weeping Eye)

There is nothing quite so irritating to our elderly patients as to be afflicted with stenosis of the lachrymal duct, commonly known as the weeping eye. The treatment for this condition has been anything but satisfactory. Several surgical methods are employed and with some value, but the method described below is so simple and so effective, that every eye, ear, nose and throat man ought to know and use it.

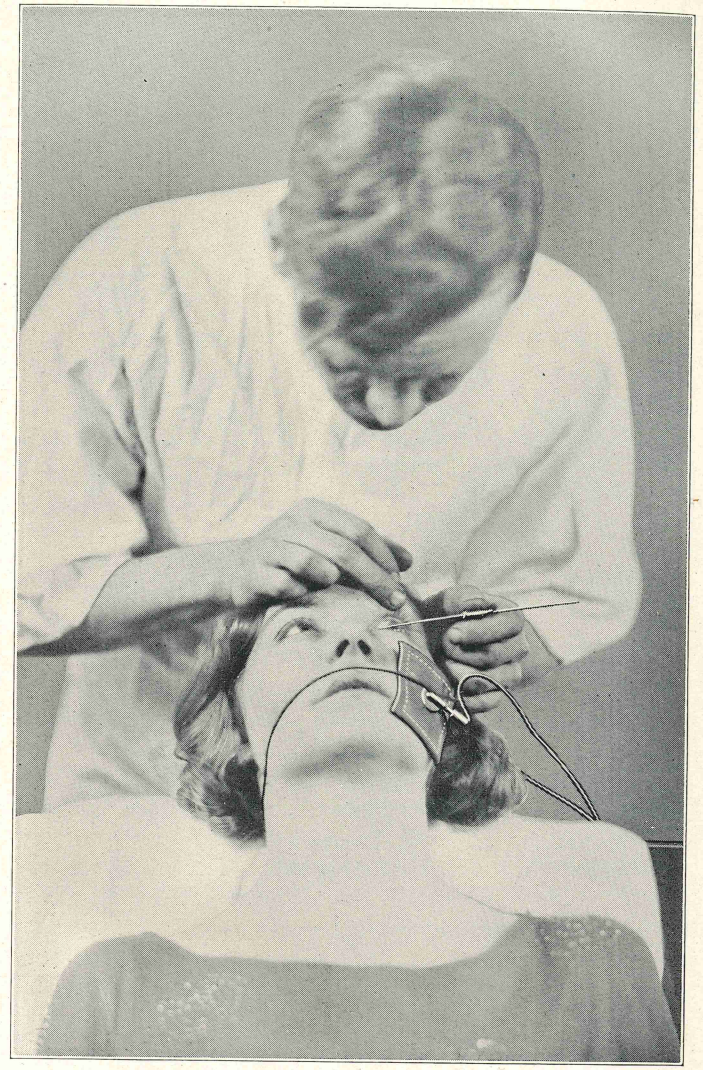
Procure a set of Bowman's dilators, or any other that you wish to use. The negative pole of the galvanic current is, as we all know, a softener of tissue. In urethral stricture it has been proven of inestimable value. There

Determining Strength of Negative Galvanic Current to be Employed in the Treatment of Lachrymal Stenosis

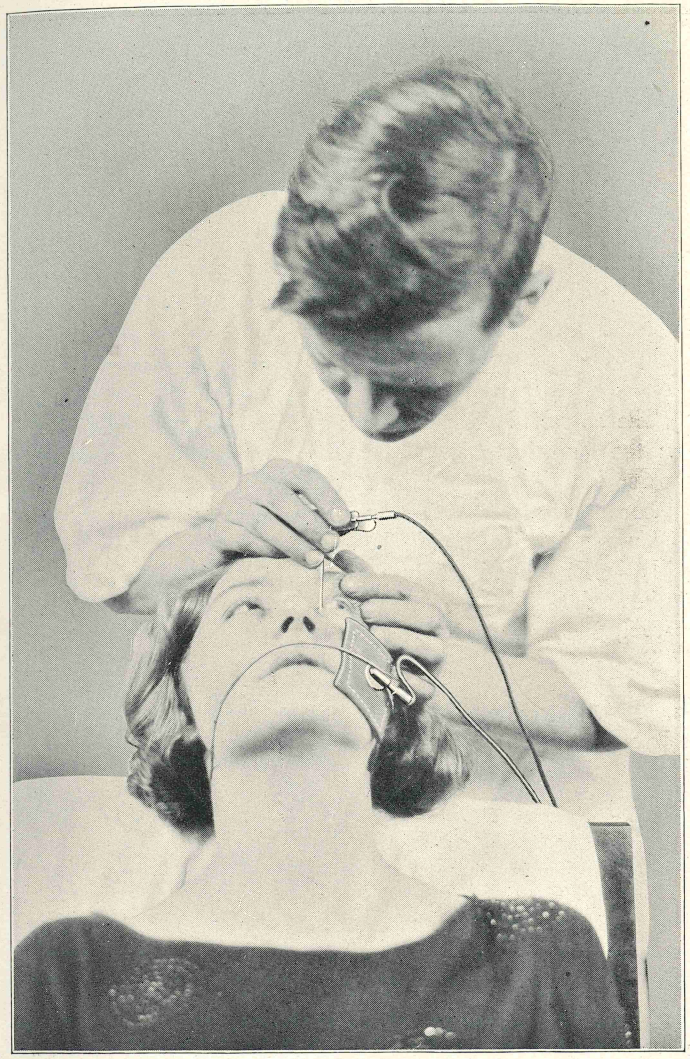
is no reason why it is not just as valuable elsewhere, where we have to deal with scar formation and stricture.

Technic—Connect the negative pole to the smallest Bowman dilator that will engage the stricture. Connect the positive pole to one of the ordinary spongio-discs. Place the disc on your cheek and the dilator on your tongue and turn on the current until you can definitely feel it on your tongue, but not strong enough to burn. This will be a very small amount of current, barely deflecting the needle of the milliampere meter, but not enough to register. Then turn off the current at the switch, leaving the rheostat handle where it was, i. e., at the point to deliver the right amount of current.

Now place spongio-disc on the patient's cheek gently insert dilator in punctum of eye and press it gently in horizontally until you strike the lachrymal bone. Then



First Step in Passage of Bowman's Dilators for Lachrymal Stenosis



Second Step of Passage of Bowman's Dilators for Lachrymal Stenosis Engaging Stricture

gently withdraw it slightly and turn it down and slightly inward. When the stricture is encountered, make very gentle pressure against it and turn on the current. In a few minutes it will slip gently through. Repeat the treatment in three days. Usually four or five treatments is all that is required, to open them up. In case you find it difficult to enter the punctum, nick it slightly with a fine pointed knife. Each time you give a treatment, select a dilator one size larger.

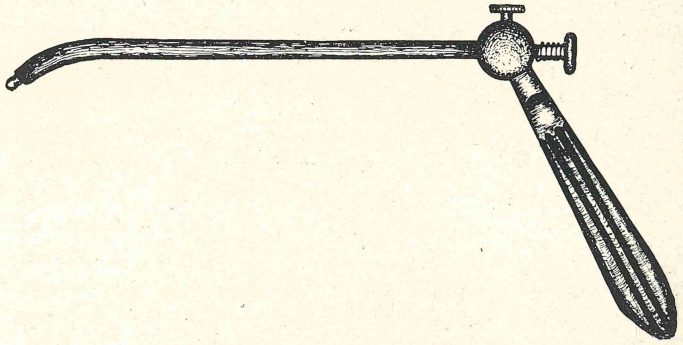
TONSILITIS

(Chronic)

The so-called desiccation or fulguration method is used on the chronic tonsil with very gratifying results. Some prefer the direct method, but on account of the inability to control the current local anaesthesia has to be employed.

I use the indirect method and find it much more valuable.

I divide the tonsil into three classes: (1) The hard indurated tonsil; (2) the soft, boggy tonsil, and (3) the rotten, diseased tonsil.



Whilst any conveniently shaped electrode will answer, the author has used, and is still using an electrode made by the McIntosh Electrical Corporation, as illustrated.

It is easily manipulated, the active point can be regulated to any desired size by means of adjustable screws on ball. The arm is insulated in black vulcanized rubber, and the metal parts heavily nickel-plated.

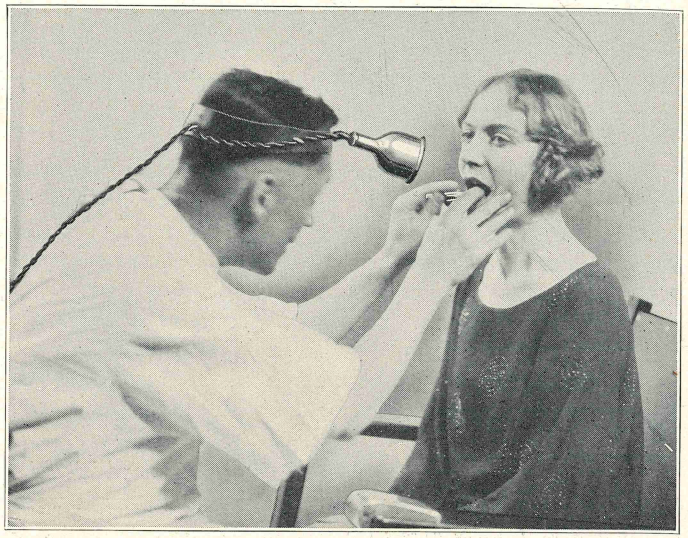
1. The Hard-Indurated Tonsil

Calls for the d'Arsonval coil. I use a variation of the Bipolar method as follows: Connect one pole to a three by five pad placed on any indifferent point as the chest for instance. The other pole is connected to a metal cuff fastened around my operating wrist or forearm. I then take the Tonsil Electrode (See cut), adjust the active point so that I can work it into all crypts and the peri-tonsilar spaces. I then have my assistant turn on the current gradually, as hot as the patient can stand it. *Use a wood or rubber tongue depressor, not metal.* Now, gradually treat all the tonsilar tissue until it has a blanched appearance. If the patient complains of the current being too hot, place one finger of either hand in contact with the patient's face and you will modify the strength of the current.

This will be followed with a slight reaction which will last a day or two. Repeat the treatment when this is worn off, which is usually every three days. In a very few treatments, the tonsil will come back to normal. Be sure that your hands or no part of your body comes in contact with the skin of the patient unless you purposely do so in order to modulate the current as mentioned above.

2. Boggy, Enlarged Tonsils

Use the indirect Tesla current instead of the D'Arsonval and apply it as follows: Place patient on auto-condensation chair connected to the pole of the Tesla coil. Turn on a medium strong current. Take the tonsil electrode in the operating hand. With other hand containing a wooden tongue depressor, expose tonsil. At same time put two or three fingers of this hand on patient's cheek. Then press point against tonsil and gradually lift off one finger at a time from patient's face until the current is as hot as patient can stand. When it gets too hot have him raise his hand as he can't talk. Gently massage over tonsil, down into



Indirect Tesla Treatment for Enlarged Boggy Tonsil. Note How Fingers of hand Holding Tongue-Depressor Controls Current

crypts and peritonsilar space. This has a stimulating effect and also cleans the crypts and kills the infection. Treat until slightly blanched.

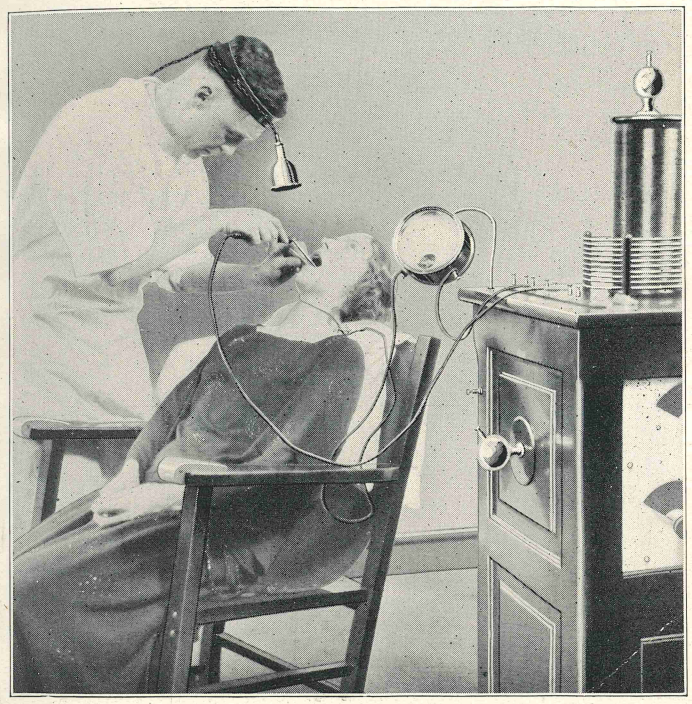
It is a good plan to follow this treatment with three minutes of positive galvanism for vaso-constrictive effect. Place a three by five well moistened pad connected to the negative pole on the chest. Connect an ordinary aluminum probe with the positive pole of the galvanic current. Wrap it with cotton soaked in normal saline solution. Gently massage tonsil, using three to five milliamperes of current.

3. Rotten, Diseased Tonsil

You can not hope to restore a tonsil of this character to normal, so it should either be removed surgically or may

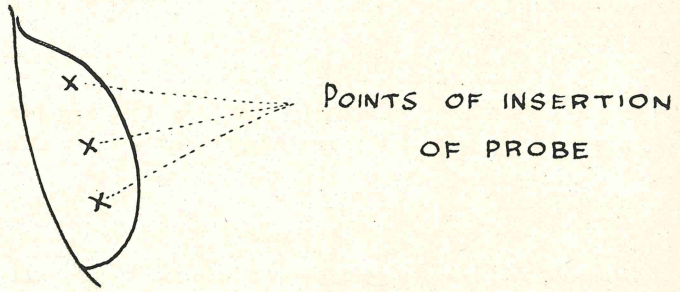
be handled to fine advantage by the electro-coagulation method.

Connect a piece of block tin about five by seven to the back or abdomen in good contact and fasten to one pole of the D'Arsonval (diathermy) coil. Connect the other terminal to an insulated electro-coagulation handle holding a long sharp-pointed aluminum probe. Set the rheostat so that 1,000 to 1,500 ma. registers on the meter. After thoroughly anaesthetising the tonsil same as for surgical removal, plunge the needle into the substance of the tonsil



Electro-Coagulation Method for the Honey-Combed (Rotten) Tonsil

about one-fourth inch and turn on the current for an instant with a foot switch. Remove and place at another point. The average tonsil will usually take three or four points (see cut).



In about ten days to two weeks repeat the process, if required. Don't burn too much. It is better to take two or three sittings instead of trying to do it all at once. It is not painful, as the current is on for only an instant, and it is surprising how little soreness there is afterwards.

PYORRHOEA

Remove all diseased, dead teeth. Clean out the margins of the gums, i. e., tartar and calcareous deposits. With a cotton-covered probe treat the gum margin with the indirect Tesla according to a similar method as described in tonsil. Let the patient retract the cheek with her finger, so that you don't have to make contact with her skin unless you so desire in order to modulate the current.

Cankers and other ulcers of the mouth, I find heal readily by attaching a cotton-tipped probe to the positive pole, after soaking in ten per cent silver nitrate. Apply in contact for about one minute, using one or two milliamperes. This is such a small amount of current that instead of bothering with a pad for the negative pole you can connect

it to an ordinary hand electrode and let patient hold it in the hand. The result of this treatment is that the silver is taken deeper in the tissues. You must be careful that this is not done on the lip, or where it can be seen, as the silver is liable to be deposited and leave a dark mark which will stay.

ACUTE ADENITIS

If not suppurative in character will respond to gentle massage with indirect Tesla current as described, giving a mild, warm current for ten or fifteen minutes.

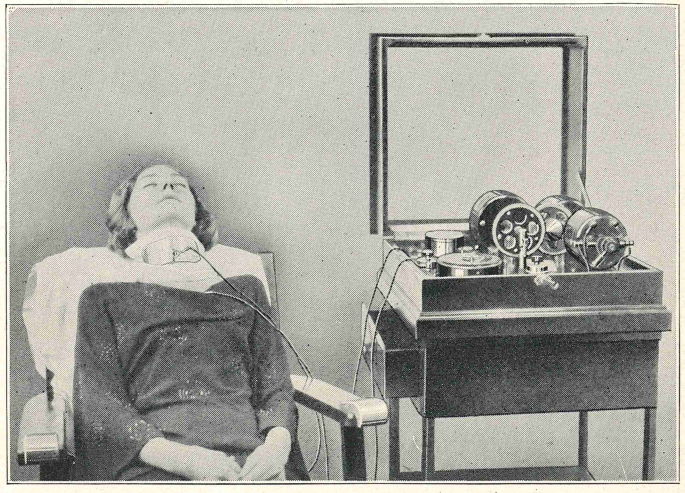
CHRONIC ADENITIS

Sub-acute and chronic adenitis is best treated with negative galvanism using iodine cataphoresis. Soak a piece of gauze of five or six thicknesses and of right size to just cover gland, with Churchill's soluble iodine or ten to twenty per cent solution of potassium iodide. (When using a remedy cataphorically it does not depend upon the strength of the solution but upon the strength and length of time of the application of the current.) Place over gland and then cut a piece of tin the right size to cover, slightly smaller than the gauze so that there will be no chance of the tin coming in contact with the skin. Connect this with the negative pole of the galvanic current. Connect the positive pole to a larger sized pad placed upon some indifferent point, usually the abdomen. Having bound both electrodes securely in place, turn the current on slowly until a comfortably strong current is felt. The amount of this will of course depend upon the size of the gland treated. Treat for ten minutes and then gradually turn off current. Give these cases treatments every day or two and give them internally Calcidin (Abbotts) 1/3 grain, four times daily.

SIMPLE GOITRE

Give exactly the same treatment as described under chronic adenitis. The great majority of these cases occur in women suffering with female disease, and if I so find the case suffering from erosion, cervicitis, etc., I combine the goitre and vaginal treatment, i. e., employ copper cataphoresis in the vagina or cervix as the case may be and iodine cataphoresis over the goitre. Always give these cases 1/3 to ½ grain of Calcidin, four times daily. Instead of using gauze, a towel folded to the right size is just as effective and not so expensive.

To bind and hold electrodes in place you will find that long strips of rubber cut from some of your old auto tubes will be just the thing to act as bandages. They can be drawn around the parts and clamped with a hemostat or some other clamp and will hold the electrodes securely in place, at the same time being elastic enough to not constrict the tissues where applied.



Iodine Cataphoresis for Simple Goitre

EXOPTHALMIC GOITRE

Graves disease, requires an entirely different method of treatment. This condition is characterised by a thyro-toxicosis. Always correct endocrine disturbance with the proper endocrines. Always give the bowels and abdomen strict attention. Colonic stasis, with absorption, etc., exists in practically every single case. Follow the technics as indicated under abdominal disease.

The first and most important thing to do is to attack the tachycardia, for if we can control the rapidity of the blood flow we can more quickly get the condition under control.

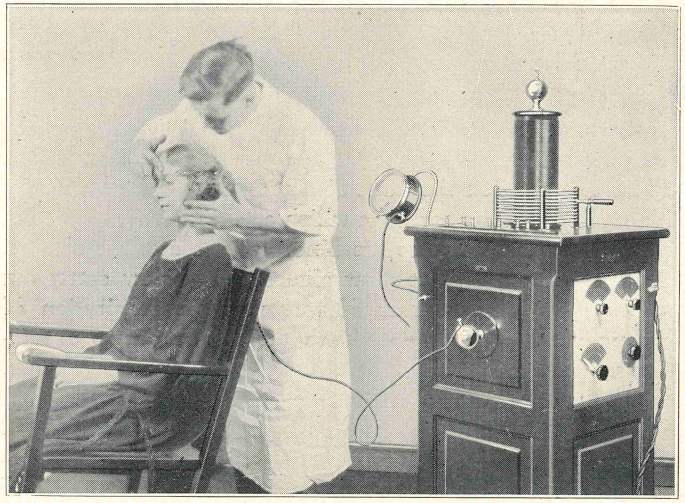
Give these cases five-grain doses three or four times daily of quinine hydrobromide.

Place one 3 by 5 pad thoroughly moistened over the 7th cervical vertebrae which catches the cardiac reflex. Place another pad the same size over the solar plexus just below the ensiform cartilage which catches the sympathetics, connect the two cords to the binding posts of the Polysine. Turn selector switch to slow sinusoidal. Screw crank out so that the same number of waves as the respiration of the patient are delivered. Turn the current on to a comfortably strong tolerance and treat at first three minutes. Increase the next treatment to five minutes. Don't go beyond this. Usually the tachycardia will be to 100 or below in two or three days. Treat every day until this point is reached then three times weekly.

Migraine, Tic Douloureaux, Torticollis, Congestive Headache are all treated according to the same plan. That is, place the patient on the auto-condensation chair or couch and draw the current out of them, using a medium strong Tesla current. Use one, two or three fingers over the area to be treated. Usually treat to relieve and repeat when required, that is, upon first sign of return of the pain. It might be twice a day or once every two or three days.

Warts, growths, etc., about the face are treated by indirect fulguration to best advantage. See skin diseases. Ulcerations, as for instance, lupus vulgarus, acne, etc., are also treated under that heading.

When treating eye, ear, nose and throat affections, apply the currents according to the sensations of the patient, rather than to rule of milliamperage. Give small doses frequently repeated until you gain ascendency over the disease and then less often. Don't discharge your cases until you are sure the effects produced are permanent.



Indirect Tesla for Trigeminal Neuralgia, Controlling Current With Fingers on Forehead

CHAPTER IV

ELECTRO-DIAGNOSIS

In making your diagnosis, always have a set routine to follow. One of the greatest mistakes a man can make is to depend upon his memory, for invaribly he will forget something, and in about nine times out of ten the thing he forgets is the main essential. On the other hand, following routine tests will often show some trouble at the least expected time. I can trace every single one of my failures to carelessness in diagnosis.

On top of this when treating a case, about every so often, you should go over the original diagnosis sheet, and check up on the results. This will show you where you are making progress and where you are not, thus allowing you to concentrate your treatment upon some particularly stubborn point.

Electro-bioscopy.

Perhaps will not be used, at least seldom, but when required is of considerable value.

It is an electrical test to prove whether or not an individual is actually dead. It has been proven that the facial muscles will respond to stimulation from the faradic battery over their respective motor points up to two hours after death. The legs and arms will react about an hour longer. The abdominal muscles hang on the longest—as high as six or seven hours.

Supposing you were called upon a case where there was a question as to whether the patient was dead—frequently this does occur—and supposing it a day since she was pronounced, or thought to be dead. If you will apply an interrupted faradic current to the motor points of, the

facial muscles for instance and contraction is produced, it would be advisable to institute methods of resuscitation and continue these methods until the patient either recovers or ceases to react to the facial or muscular tests just described. Use a sufficiently strong current to produce a decided contraction on your own muscles.

While speaking of resuscitation, the following method for drowning, gas asphyxiation, etc., is far superior to the ordinary course:

Place two small pads 1½x2 inches over the foraminae of the seventh cervical vertebra so as to reach the vagus nerves, and apply a sufficiently strong faradic current interrupted at the rate of twelve a minute to actually lift the chest and produce artificial respiration.

NOTE—The interrupted rapid sinusoidal may be used just as well as the faradic. However a small faradic battery is inexpensive and easy to carry for this purpose.

Electro-Spinal Diagnosis.

This test is very simple and yet one of the most important diagnosis tests that we have.

Technic—Place a well moistened 3 by 5 pad over the sacrum and connect it to one terminal of the continuous rapid sinusoidal current. Connect the other terminal to a small spongio-disc placed in a handle. Press it on the spine at the base of the skull, and turn on the current, through the rheostat, until the patient experiences a comfortably strong current. Then slowly draw it down over the spinous processes. As you come to sore spots the patient will decidedly feel them and tell you so. Make a cross with a lead pencil, and repeat the process to check up,

that is, see, if they are actual sore spots. Now go to your chart (Ireland's Spinal Reflex Chart, see page 37) and see what organs are supplied from this center. This helps you locate the organs affected, but of course doesn't tell you what the affection is. To explain how valuable a test of this kind is—a patient came to me with all the symptoms of an acute appendix. This case showed extreme tenderness over 7th, 8th and 9th dorsals, worse on right side. Cystoscopy and the X-ray showed a stone in the ureter at about the region of the appendix. Another example—supposing a case presents with apparent stomach trouble, with burning eructations, this test would be important to differentiate between the stomach and duodenum, etc.

Confined Active Pus

How frequently is it desirable to know whether an area to be treated contains active pus, as for example mastoiditis, appendicitis, mediastinal irritation, pus tubes, etc.

The following test is very sure for this condition. It is not dependable for free pus, but where the pus is confined is almost absolute.

Technic—Place a small electrode a little smaller than the suspected area in close contact, and connect it to the positive pole of the galvanic current. Connect the negative pole to a larger pad placed at some convenient indifferent point. Turn on five milliamperes for five or ten minutes. If this produces pain or distress in the affected area, immediately change the selector switch to the rapid, continuous sinusoidal, and give a comfortably strong current, for five or ten minutes. If this does not relieve the pain or makes the pain worse, you have definite proof of the existence of confined, active pus.

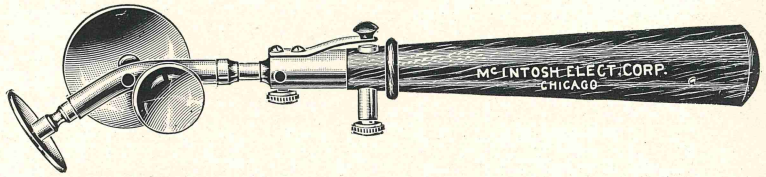
When treating confined pus always give it drainage wherever possible.

Differentiation of Peripheral and Central Paralysis

If a case presents to you with paralysis, of course the history of occurrence, etc., has considerable bearing; however the following test is very accurate:

Note—Procure a chart of motor points.

Technic—Place a three by five pad well moistened over some indifferent point usually the abdomen and connect it to one terminal of the interrupted rapid sinusoidal (or an interrupted faradic). Connect the other terminal to the muscle testing electrode (see cut) selecting a disc of the



proper size. Now place this disc over the motor point of the corresponding muscle of the unaffected side and turn on a sufficiently strong current through the rheostat to produce a contraction of the muscle. Then apply this electrode over the motor point of the corresponding affected muscle and note the results. If the contraction is as strong or stronger than on the well side then your case is one of *central* origin and treatment applied directly to that muscle will do harm. If no contraction is produced or a feeble one the case is of peripheral origin and will be benefited by treatment applied to that muscle. For technic of treatment see Extremities.

Reaction of Degeneration

When the nerve supply to a muscle has been severed by injury or disease, atrophy sets in usually at the end of the second week and reaches its height at about the sixth week.

At first, that is for the first two weeks, it will respond

to an interrupted sinusoidal or faradic current after which it ceases to respond to the faradic and will only respond to an interrupted galvanic. Technic of application same as for peripheral and central paralysis, mentioned above. That is, find the smallest amount of an interrupted faradic or sinusoidal that will produce a reaction on the well side. Apply this to the corresponding muscle of the affected side. If no response is produced, substitute for the sinusoidal the interrupted galvanic following the same technic.

Treatment will be found under Extremities.

THORAX

Bronchitis

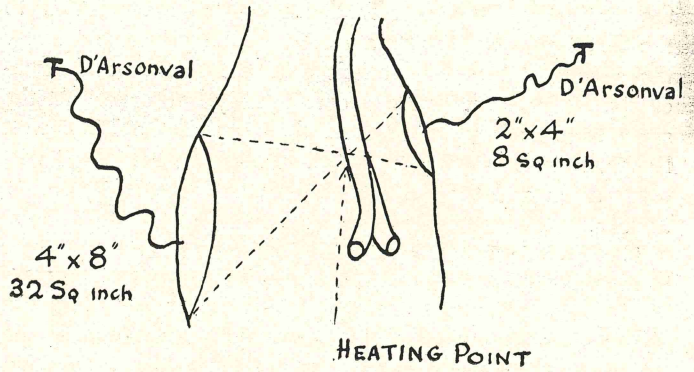
Very excellent results can be obtained in the treatment of bronchitis, both the acute and chronic types. Even the old cases of bronchiectasis with purulent bronchorrhea can be markedly benefited.

Acute types are benefited by the Tesla current. Place the patient on the auto-condensation table connected to the Tesla coil, delivering a medium strong current. Draw the current out of the patient over the trachea and bronchials, giving as hot as can comfortably be borne. At the same time expose the chest to the rays of the 1,500 watt light. Treat for fifteen minutes. As a rule the cough will quiet down and the patient will breath more freely immediately.

The chronic forms require a different treatment, for we know that in this condition we have a thickened membrane showing actual pathological changes. This is best attacked by diathermia using the D'Arsonval coil. If you will note on examining the Anatomy of the chest, the main bronchii are about one-fourth to one-fifth the distance through the chest wall anteriorly. Remembering the rule of the distance of the hottest point when giving diathermia, we will select our electrodes accordingly. A piece of block tin about two by four inches will be sufficiently large for the anterior

electrode. For the back we want one with an area four times greater, as this will bring the heat point approximately where we want it. The area of our small or active electrode would be eight sq. in. So we will select for the back a piece about four by eight or having 32 sq. in. Moisten the skin thoroughly with soap. Clean the electrodes in the same way, Apply and mold them in good contact with the chest wall. Strap in place with rubber bandages or in this case, lying on the back with a sand bag on the front electrode generally maintains good contact.

The limit of dosage in this case would be 800 milliamperes. I would not exceed 600, and would treat for one-half to one hour, according to the result produced. The treatment will sometimes be followed by an increase of discharge and slight aggravation of the cough. If it does so, inform them that after two or three treatments this will cease and will then usually be followed by steady improvement. See cut of application.



Pleurisy

Acute plerisy is best attacked with a combination of treatments, cupping, 1,500 watt light, and Tesla diathermia. Apply a suction cup over the painful area, and give sufficient suction to produce a purplish discoloration. Continue for

about two minutes and follow with treatment with the Tesla auto-condensation treatment the same as described, under acute bronchitis. Use in conjunction with this, your usual medicinal treatment, antipyretics, antizymotics, and thorough elimination. Potassium iodide in five grain doses, is very effectual as a clean up.

Empyemia

Should require the same treatment as described under mediastinal abscess.

Pus in the pleural cavity should of course first have surgical drainage, usually by resection—if not too extensive may be sufficient to go between ribs and insert drainage tube. Now, is when electrical treatment is of great value, employing what I have termed the "electrical drainage treatment," which is thoroughly described under the treatment of mediastinal abscess.

Pneumonia

Pneumonia forms one of the big exceptions to the rule in regard to the D'Arsonval current. While increase of temperature is bound to occur when this is applied to acute inflammatory conditions, still in this condition, what possible harm could be accomplished is by far offset, by its ability to soften up the consolidation and hasten resolution.

Technic of application is similar to the treatment for chronic bronchitis. I usually use a larger electrode for the active one in order to cover the whole area of consolidation, in a lobar pneumonia. It is, I should say about four by six inches. Our heating point in this condition wants to catch about the center of the lobe which on account of the curvature of the back, spine, etc., throws it about one-third the distance, so select for your back electrode a piece of block tin of three times the area of the front electrode which would be about eight by nine. Place in good apposition. Our limit of dosage is now about 2,400 milliamperes. I would not use over 2,000, and I would treat the first time

for about fifteen minutes. If not much results were obtained, in three or four hours I would repeat, treating for one-half hour.

The results of this treatment are very remarkable. Practically every single case will recover by lysis instead of crisis. Treat every four hours, to once a day according to results, severity of cases, etc. A very interesting article giving case reports of several cases treated, was printed in the October, 1922, issue of the American Journal of Electro-therapeutics and Radiology.

Cardiac Disease

Far more cases are whipped to death by the use of digitalis than are ever cured. Not by that do I mean that digitalis is of no value. It most assuredly is. However, the average patient going through a crisis with a mitral leak is given digitalis and mourned over afterwards.

To explain when we take up the study of the abdomen we will find that splanchnic stasis is a very common condition. On account of certain anatomical conditions as well as habits, etc., this condition is becoming more prevalent. Probably the greatest cause of breaking compensation is due to the fact that mechanical stasis occurs, throwing a tremendous load, upon a heart already crippled. If we now whip that heart without attempting to remove the load we will nine times out of ten whip it to death. Methods of relieving splanchnic stasis are given under Splanchnic insufficiency.

For tonic action to the heart the method described under exophthalmic goitre is productive of excellent results. Digitalis in small doses is very valuable after the load has been lifted, but not before.

Fatty heart requires similar attention, and must be handled more cautiously even than the mitral leaks. One of the most important signs of a fatty heart is a short, sharp, first sound.

Angina Pectoris

Remarkable results can be obtained in this condition by diatherma one day followed by negative galvanism the next.

The diathermia, probably has the best effect. However, the negative galvanism relieves the distress and is actually indicated, although I am somewhat doubtful as to whether the actual softening effect of this pole is sufficiently effective, clear through the chest wall.

Technic—Apply two electrodes of block tin of equal size three by three inches directly over the heart, anterior and posterior. This focuses the heating point half way between which is about right to catch the heart in its entirety. The limit of milliamperage is 900 ma. Of which I usually use about 700. I treat these cases according to the usual method, i. e., give them about 200 ma. for three or four minutes then 400 for about the same length and then the 700 for the balance of the treatment. I almost always treat them for three-quarters to one hour, then slowly turn the current off, that is, down to 500 for a few minutes then 200 a few minutes.

Diathermia should always be given this way, the results afterward are better. I suppose the reason is that suddenly changing the current irritates the tissues through which it is passing.

The next day a three by five pad is soaked in a twenty per cent solution of soda salicylate and applied over the heart, another pad of the same size is soaked in water and covered with a good lather of soap and placed over the fourth dorsal vertebrae. A galvanic current of fifteen to twenty ma. is passed for fifteen minutes. Attach the negative pole to the pad on chest, the positive to the back pad.

Treat every day until all signs of the attacks have vanished and then three times weekly, twice weekly, once weekly, watching for any signs of recurrence, at the least sign of

which, immediately change to daily treatments until permanency of results are obtained.

The Plate Glass Method for Tuberculosis

There is a certain stage of pulmonary or laryngeal tuberculosis (in the incipiency) where diathermia would be of extreme value, but we are somewhat afraid to use it on account of the danger of precipitating a hemorrhage or otherwise exciting the condition. The danger of hemorrhage is due to the rush of current through the body. While the high frequency is too rapid for the sensory system it is not for the sympathetics, particularly the vaso-motors. As a result after a diathermia there is a tendency to relaxation, a sort of peresis, or obtunding of the vaso-constrictors. By means of the so-called plate glass method I have overcome this feature, and while the heating effect is markedly reduced, it is of about the right character for this stage of the disease.

Technic—Lay the patient on the auto-condensation pad and connect one terminal of the D'Arsonval (diathermy) coil to it. Place the plate glass auto-condensation electrode over the chest and connect it to the other terminal. Turn on a medium strong current but not sufficiently strong enough to *jump through* the plate glass. Then connect a long piece of conducting cord to a water pipe or other ground, and connect this to an ordinary hand electrode. Grasp this with one hand and draw the current out of the patient at the point of irritation, with one or two finger tips of the other hand. Be sure before turning the current on that the cords from the apparatus are held away from the patient's body so that there is no danger of contact, otherwise the current will jump through the cord and burn. Also be sure that after taking the hand electrode in your hand (connected to the water pipe) that you yourself don't touch the cords or the apparatus, otherwise you are liable to get a severe shock.

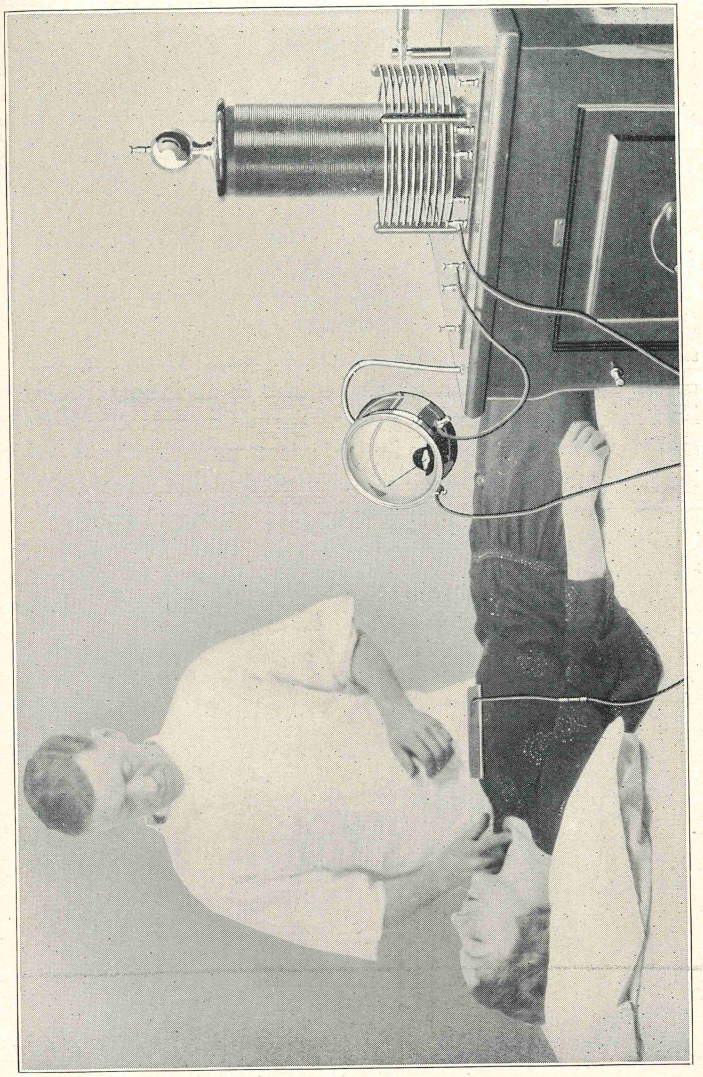


Plate Glass Treatment for Tuberculosis

Treat the patient in the morning before the onset of the temperature. Always remember this point: after the acute symptoms are quieted down, then switch to diathermia and auto-condensation in alternation. The diathermia for local effect one day, and the auto-condensation for general effect the next.

WAGGONER PLATE GLASS METHOD

I at first thought I was simply modifying auto-condensation. However, this is not the case. As you will note, the patient is not directly connected with either terminal of the D'Arsonval coil but simply lies in an induced field, between the two electrodes, i. e., the plate glass electrode and auto-condensation pad. This is then really an auto-induction treatment. The plate glass does not have to be placed next to the skin. You may set it on top of the clothing. The particular thing to watch, is to see that you have sufficient current to produce a good induced field but not enough to jump through the plate glass. When this occurs you will hear a crackling noise.

This method of treatment is not only indicated in tuberculosis, but any condition where there is ulceration or danger of hemorrhage. It however is a weak current and not capable of producing organic changes like direct diathermia or auto-condensation, but is to tide your patient over until he is in a safe condition for these methods.

Mediastinal Abscess

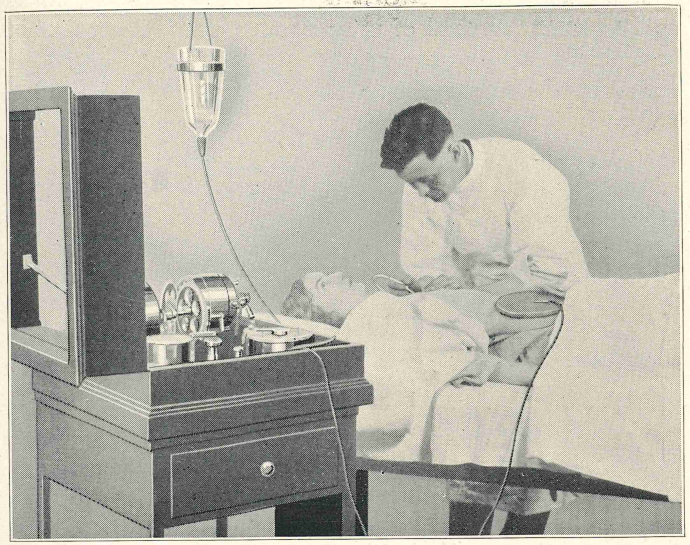
The surgeon who has to handle these cases knows that he has long and hard ones to deal with, but with the following method they are simple to handle:

In the first case, being sure that there is pus in the chest, as shown by the clinical history and the diagnostic sign of confined pus, the thing to do is to institute immediate

surgical drainage. Don't put these cases off for an infinite amount or destruction will occur if you do. Trephine the sternum and give the pus drainage. Iodide of potass is then indicated internally to help absorption and reconstruction.

Treat by what I call electrical drainage. Technic as follows:

If the condition is acute or sub-acute, you will find the pus thin in character and as a rule alkaline to litmus. In that case fill an ordinary fountain syringe full of hot water (120 degrees) and add to it sufficient copper to color solution green. Hang it about two feet from patient. Then attach the cord from the positive pole of the galvanic current to a piece of block tin and drop it down into the fountain syringe. Connect the negative pole to a large, well moistened pad and place over the abdomen. Now insert in



Electro-Drainage Method for Mediastinal Abscess, Empyemia, Etc., Applying Cataphoresis Through the Copper Sulphate Solution

the end of the rubber tubing a piece of glass tubing, rubber, or anything not metal. The best I have found is the glass part of an ordinary eye dropper. The constricted end lets the solution drain out slowly. Now insert this into the wound and let the solution slowly drain in and out. After it has started, have your nurse slowly turn on the galvanic current until five or ten milliamperes show on the meter. Be guided by the sensations of your patient. Continue this drainage with the full two quarts taking from five to ten minutes to it. Just before it all drains out, have the nurse slowly turn the current off.

The effect of this treatment is not only draining the pus cavity, but at the same time by the power of cataphoresis driving the copper deeper into the pyogenic membrane lining the cavity.

If the condition treated is chronic, the pus is thick and acid to litmus, instead of using copper, use iodine solution or Dakin's hypochlorite solution in the fountain syringe and drop the negative pole into it instead of the postive and connect the positive pole to the abdominal pad. Otherwise treat the same.

The effect of this method of treatment is very positive. It will clean up deep abscesses in one-third the time that the ordinary drainage method will, and as a consequence will clean up conditions that the ordinary methods won't touch. It is not only indicated in mediastinal abscess, but any form.

High Blood Pressure

High blood pressure is a symptom, but usually the symptom is indicative of one of two things: Some diseased condition characterized by general toxicosis or some condition characterized by organic changes requiring increased pressure in order to maintain circulation. Example of the former would be, say, a congestive headache. The latter would be a sclerotic kidney (chronic interstitial nephritis

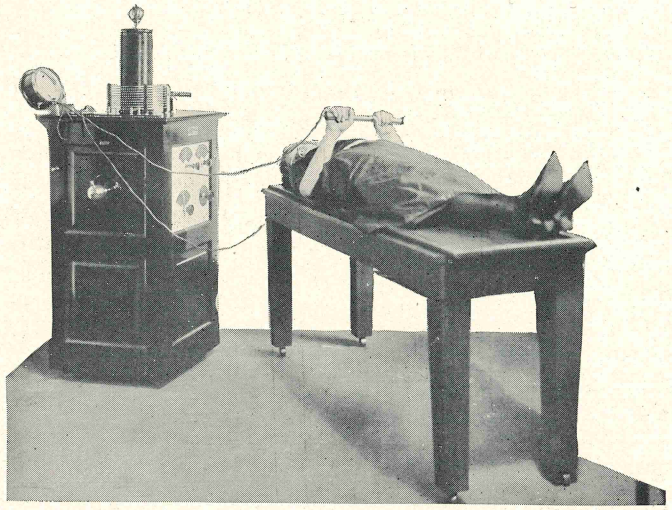
or atheroma of blood vessels). The latter is, however, usually an ultimate result of the former. Treatment is based upon that stage. However, regardless of the kind, there is one thing that should always have direct attention, and that is, colonic infection or stasis. See abdominal diseases for treatment of this condition.

Toxic high blood-pressures are best treated by Tesla auto-condensation, the indirect method. Place the patient on the auto-condensation table, couch, or chair, as the case demands, connected to the pole of the Tesla. Give a medium strong current and draw the current out of the patient with one or two fingers. Usually the treatment is given until relief of the main disturbance is produced which averages about fifteen minutes. Examples—A patient presents with a congestive occipital or frontal headache. The pressure will be increased maybe up to 150. Place the case in the auto-condensation chair and draw the current out of the occiput or frontal as the case may be until relief. Repeat on return of the symptoms. The salicylates internally, are of value in these cases, aceto-salicylic acid, etc.

This same method of treatment is of finest value in acute and sub-acute rheumatisms. If the patient suffered with backache, instead of headache, as is often the case, place him face downward on the auto-condensation pad and treat through the painful back. Always have the current strong enough to deliver a comfortably warm current at the point where you draw it out.

Organic High Blood-Pressure

Requires more heat to increase body chemistry. Treatment is with the D'Arsonval coil. Place the patient on the auto-condensation couch and connect to one terminal of the D'Arsonval current the other to the auto-condensation handle. (See cut.) It is a good plan to put a pillow under the hands to keep them from coming in touch with the abdomen and thus preventing sparks. I usually never give



Auto-Condensation with Hogan High Frequency
Reduces High Blood-Pressure

more than 800 to 1,000 milliamperes, but treat them longer if I do not get results.

There is one condition you always want to watch when treating for high blood-pressure, and that is, pulse pressure. If the pulse pressure (difference between systolic and diastolic pressures) is at twenty or below, auto-condensation is contra-indicated.

Supposing you had located some particular organ affected as for instance, the kidney. I would use direct diathermia for the kidney, according to the method described under Pelvic diseases, one day, and auto-condensation the next. The same principle would apply in case of endarteritis or *arteritis obliterans* of the brain.

Low Blood-Pressure

If the low pressure is not due to run down conditions, with anemia and general lowered tone, you can be pretty

sure that your case is one of splanchnic insufficiency and abdominal (blood) stasis particularly if the low pressure rises when the patient is lying down. Treatment is outlined under the treatment of splanchnic insufficiency.

Stimulation over the seventh and eighth dorsals, stimulate the reflex of vaso constriction of the splanchnic area, and tends to drive the blood peripherally, thus increasing pressure. It may be done by concussion, although is usually better handled by placing one of the pads of the sinusoidal over this spinal area at the time you are treating the splanchnic deficiency, thus killing two birds with one stone. If, however, you are purely after the effect of this reflex, concussion will do the work.

After studying over the treatment of different thoracic diseases, you will note that the principle is the same as when treating elsewhere—we are primarily using each current where definitely indicated. In Bronchitis we do not use the sinusoidal after diathermia so much, as it is hard to get the penetration. Recently I have been applying it by means of two pads put under each arm pit, and am noticing some benefit from its use. The slow sinusoidal is the current generally used. It can be applied to very good advantage over the different spinal centers according to Ireland's method. However, its action is purely on the spinal center and in that case concussion would be just as good and take less time.

CHAPTER V

THE ABDOMEN

Splanchnic Insufficiency

Means exactly what the word implies—an insufficiency of the pelvis and abdomen. It does not necessarily mean a splanchnoptosis, although some degree of dropping of the organs usually exists.

Two great systems are always out of order in splanchnic insufficiency, they are the nervous system (tonic) and the circulation, resulting in a greater or less degree of stasis.

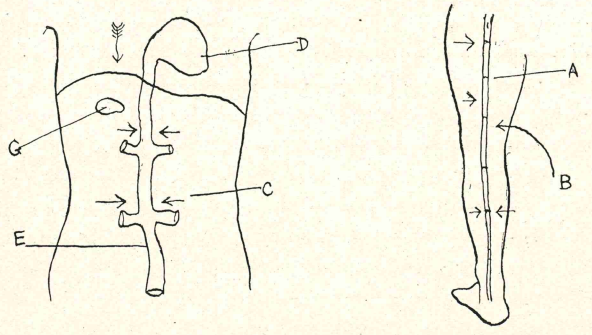
In the introduction of this book reference was made to how tone was normally produced and that this tonic discharge had to be of the right character, and delivered at the right time in order to produce proper intra-abdominal tone, just the same as the spark has to be of the right character and delivered at the right time in order to produce efficient function from the gasoline cylinder. It is then dependent upon two things: First, proper intra-abdominal pressure to produce the proper amount of pinch on the terminals of the afferent system of nerves (those going to the solar-plexus); and, second, the nerve terminals, in fact the whole reflex must be in the proper condition to receive and deliver reflexes of the right character. If, then, any deficiency occurs, weakening of the abdominal wall, improper clothing, sitting in cramped position, etc., that will interfere with proper breathing, abdominal tension, it will result in improper intra-abdominal pressure. On the other hand any irritation or inflammation continued for any length of time so upsets the nerve reflexes that an abnormal reflex is distributed, tending to produce abnormal tone. Supposing we were considering a case of colitis. If this irritation is ex-

cessive then it would be characterized by increased peristaltic action and increased secretory function resulting in diarrhoea or spastic colitis. If the irritation was deficient, i. e., if the reflex is deadened, it would be characterized by constipation and atonic colitis, or if disproportionate, alternating diarrhoea and constipation.

The circulation of the abdomen is maintained or equalized the same as is nerve tone. I am referring more to venous circulation.

Circulation in the leg for instance is maintained or assisted by two things: First, little valves placed intermittently to prevent back flow; and, second, the squeeze produced by action of the muscles of the leg.

In the abdomen we have no valves to prevent back flow. The veins are not placed in muscular tissue, but in loose areolar tissues. What then assists the return flow? As the diaphragm descends intra-abdominal pressure is increased which produces a pressure upon the veins pumping the blood along very much like you would pump water through an ordinary bulb syringe. This same process also empties the gall bladder. (See cut below.)



If then, any deficiency occurs, it is bound to directly affect nerve tone and circulation. These are the two prime factors concerned in splanchnic insufficiency, and the worst

part of it is that they turn around and cause or maintain each other, forming a sort of vicious circle.

Splanchnic insufficiency is very common, much more than we imagine. Fully 80 per cent of all people show definite signs of it, even though they are not yet suffering from any serious manifestations. It is the foundation for heart, kidney and other circulatory diseases. It is the agent that allows or maintains a disease after it has formed. For example if a person were normal and would eat something causing an acute illio-colitis, after the acute attack had subsided the condition would clean up, while a person with splanchnic insufficiency would retrograde into a chronic inflammation.

"A" denotes valves which are placed intermittently in veins of leg preventing back flow; while the muscles of the leg "B" promulgate the flow onward. "D" showing position of heart in relation to diaphragm. "C" point of descent of diaphragm which increases intra-abdominal pressure, producing a pinch on the blood vessel "E" and the gall bladder "G."

The diagnosis of splanchnic insufficiency is definite. There are three signs which are positive. As they are given in order so is their value.

1. *Abdominal Tension Test.* (A. T. T.)

This is the most important sign of all. It is the earliest sign and the most dependable.

Many years ago, Glenard found that his cases of severe splanchnoptosis were relieved by applying a tight belt. Why? because the pressure about the abdomen made it easier for nature to produce a more normal intra-abdominal pressure. This is called the Glenard Belt Test or Treatment. If this test is of value in the advanced cases, I then conceived the idea that it could be utilized as a diagnostic test in the early stages. Knowing that in splanchnic insufficiency the circulation and tone are the principal systems affected, I commenced to experiment. Having no way of

measuring or detecting real early signs of tonic deficiency, I turned to the circulation, and have found that with the patient standing up, if there is any splanchnic insufficiency, correction of that will be registered with a change of heart tone. Place the patient in the erect position and put a stethoscope over the apex beat. It may be rapid; it may be slow; but after making a number of examinations you will note a peculiar hardness or sharpness to the sound. Now, still holding the stethoscope in place have an assistant make gentle pressure over the lower abdomen. In a few seconds the heart action will change. The tone will be softer and smoother. The reason for this is, that by increasing the intra-abdominal pressure, you make it easier for the heart to equalize circulation.

2. The next test of importance is blood-pressure, which is lower standing than when lying down. This is not an early sign, but occurs after definite stasis has formed. When splanchnic insufficiency once is established, nature whips up the circulation in the attempt to drive the blood through, but in so doing, finds that she only increases the stasis, because the arterial circulation is dependent on entirely different factors, i. e., heart pressure, plus elasticity of the arteries. Finding that this method only increases the blood volume, she takes another course and lowers the pressure, thus trying to prevent so much blood from going in, in order to keep pace with the venous return flow, and the result is, we have a condition characterized by a blood pressure lower when standing than when lying down; the lying down facilitates or assists the return flow and the pressure rises. This symptom is not always present. It is usually absent in the early stages and frequently so in the later, for the reason that in lowering the pressure it may interfere sufficiently with the circulation of some particular organ to the extent that nature has to disregard the general stasis in order to supply sufficient nourishment for the life of that particular organ. On the other hand there is usually con-

siderable toxicosis associated with abdominal disease and the effect of this on the vegetative centers would be, to increase pressure.

3. Supra-pubic Depression. Normally there should be a shallow depression in the abdomen just above the pubic bone. Don't jump to the conclusion that because your patient has a pot belly that he is suffering from splanchnoptosis. (The little child always has a pot belly.) But even though he does have, if there is no splanchnoptosis you will find the shallow depression when he stands erect and you view the abdomen from the side. You will find your worse splanchnoptosis cases in the long slender waists. This is not an early sign. Also be sure if you see the slight bulge of the abdomen which is characteristic of the condition, that it is not a roll of fat. Place the edge of your palm on the abdomen just above the pubis and roll the hand into the abdomen and you will feel and see the organs rise. The depression is normal, the bulge abnormal.

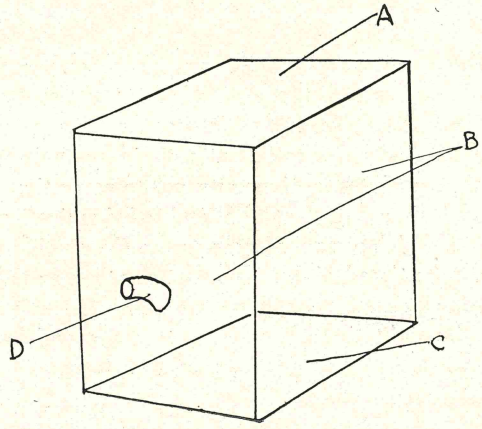
Remember that the cause of splanchnoptosis is splanchnic insufficiency. Intra-abdominal pressure resulting in proper nerve tone floats the organs up into position. The ligaments do not support them, they merely direct position and act as carriers for lymphatic, blood and nerve supply. The cause of insufficiency may be and very often is, due to two great things, and that is, the American people eat about 75 per cent more more than they should, which means an overloaded colon; and drink only about one-half the amount of liquid they should, and you cannot flush a sewer without water.

Treatment

The best way to remember the abdomen and pelvis is to consider them together as a box. We have to see that all sides of the box are in good shape as well as the contents. This condition must be righted in all chronic abdominal

and pelvic complaints, if we ever hope to produce permanent results.

The following cut represents a box, the top is the diaphragm, the sides the abdominal wall and back and the bottom the pelvis:



A. The diaphragm. When a person develops splanchnic insufficiency, breathing becomes abnormal, very frequently. The crux muscles become too strong for the diaphragmatic muscle and, gain the ascendency and then instead of descending piston-like, it descends wave-like from posterior to the anterior. This tends to weaken intra-abdominal pressure that much more. There is one symptom characteristic, when such a condition exists, and that is, difficult breathing. By that I don't mean dyspnea or hyperapnea as seen in acidosis, neither is it asthmatic. They complain of difficulty in filling the lungs, do not seem to draw the air in good and deep.

Treatment to overcome this feature is as follows: Place two small pads (spongio discs) connected to a bifurcated cord over the exit of the two phrenic nerves (see chart

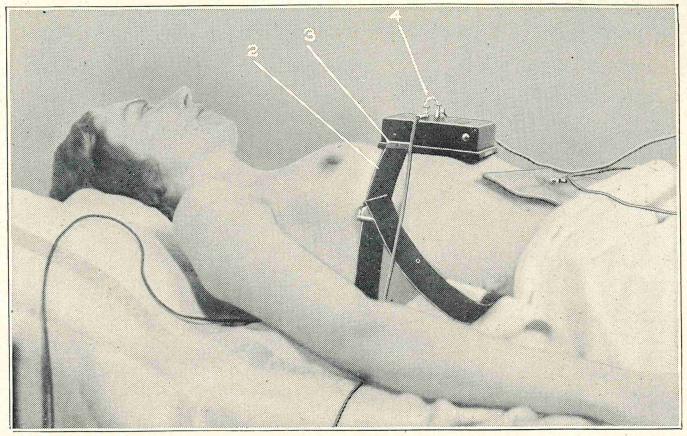
of motor points) and place a three by five pad over the solar plexus. Strap on the Respiratory Interrupter, connect up to the rapid sinusoidal and deliver an interrupted rapid sinusoidal current through the apparatus, giving it comfortably strong, thus affording a fine respiroidal current.

(See cut page 162.)

The respiratory apparatus is a boxlike affair which sets on the abdomen and is connected by means of a belt "2" which goes around the patient. As the patient breathes tension is made on the belt which works a lever in the apparatus that breaks the continuous rapid sinusoidal current into segments or interruptions and at the same time delivers the interrupted current at the end of inspiration. This current then which we now know as the Respiroidal Current will always be timed right. No matter whether the patient breathes deep or shallow, long or short, it automatically comes at the right time, because it is made and broken by the respiration itself. "3" is a switch which throws the interrupter in or out of the circuit. "4". Binding posts to which one connecting cord from electrical apparatus is attached and the other is for one of the cords going to one of the electrodes on the patient. The other electrode is attached directly to the electrical apparatus delivering the current.

The respiratory apparatus should be used in all pelvic and abdominal complaints where purely nerve tonic effects are required. Truly you can tone up the nervous system with the ordinary interrupted rapid sinusoidal current, but with this aparatus you will get much finer results. Remember a gasoline cylinder will work even though the current isn't timed right, but how much better does it perform if the current firing the explosion comes at exactly the right time.

The following cut represents the method of applying it for treating diaphragm insufficiency.



A comfortably strong current should be given for five minutes. Treatment should be given daily until definite improvement is secured, which will be shown by relief of the difficult breathing.

Hiccough

This same treatment is valuable for those intractable cases of singultis, or hiccough.

B. The Abdominal Wall. A weak, flabby abdominal wall must be toned up or it will be impossible to re-establish normal pressure. All hernias or ruptures must be surgically taken care of. We usually are taking care of the muscles of the abdomen at the same time we are treating deficiencies of the contents (bowels, stomach, gall-bladder, pelvic organs, etc.). For example: Supposing we are treating a case of constipation, from an atonic colitis, for that is what they usually are. Go over the abdomen with percussion, marking the different areas of dullness. Now place a three by five pad over the junction of the seventh and eighth dorsals which catches the greater

splanchnics. Place the other pad over the first area of dullness beginning on the lower right side. Connect to the slow sinusoidal, giving a comfortably strong current for about three minutes. Now move the abdominal pad to the next area along the course of the colon and treat two or three minutes, and so on until all areas are covered.

This not only tones up the musculature of the bowel but at the same time, builds up the abdominal wall. Never treat an abdomen with large pads indefinitely. Always select pads about the size of the area to be treated, and apply them, in as close relation as possible to the offending tissues or organs.

C. The Pelvic Floor. It is just as impossible to correct splanchnic insufficiency, if you neglect this part, as it is to neglect the abdominal wall or any other part. In the male the pelvic floor is not quite so important. In the female, explore in the vagina and see if the levator ani muscles are intact. Don't pay attention to the perineum, although, of course, a large tear should be remedied. However, it is not the cause of prolapsus, etc., for you will often find a young primipara with a good perineum afflicted with a procedentia. But you will find that this case has either a weak, flabby set of levator ani muscles or an actual hernia or separation of them. To test this insert finger in vagina and press along sides and around the rectum. If the levator is lax you will hardly feel the muscle. If the fibres are split over the perineal body, you will feel the finger slip between them. If a separation of any extent exists surgical interference may be required. However, by the proper treatment, they can be toned up wonderfully. The best method of treating this condition I have found to be the Pelvicmultimode. Place the patient on the apparatus in the usual manner (see pelvic diseases). Insert Neiswanger's bag electrode. Connect the reservoir of the apparatus to one terminal and the rectal bag to the other terminal of a slow sinu-

soidal current and give a comfortable strong current for five minutes. Always precede the treatment by bi-manual manipulation of the pelvic and lower abdominal organs to as near normal as possible.

D. Treatment of the Contents, must have, of course, special consideration. In case of constipation, special attention must be paid to the defecation ring (see constipation).

NOTE—Having read this over and understanding the cause of the abdominal tension test, the frequency of its occurrence, etc., I believe you can at once see the close relation of this condition to chronic cardio-vascular disease. To my mind it explains many of the obscure heart and kidney cases. And while it may not be the direct cause it is a predisposing one that leads to its production or aggravates it after it occurs. Never neglect this condition in every single heart and kidney case. Also, look into it well in your old asthmatics.

When treating the abdominal contents always select small electrodes and place those electrodes where they should be placed. For example, supposing you are treating the appendix, place the active electrode over McBurney's point and the back pad over the second and third lumbar, a little to the right in order to catch the spinal center of the appendix. Or, if the stomach—one pad over the stomach and the other over the fifth dorsal, a little to the left.

Length of treatment depends, of course, upon the condition to be treated: if abdominal adhesions or other conditions where you require the high frequency currents; follow the rule of dosage; but as a rule you will have to treat for a longer period of time than usual for two reasons: First. they are deep; and, second, radiation is rapid.

Acidosis

Acidosis is almost always the result of colonic stasis or other severe abdominal insufficiency. Electrical treatment is along the lines just covered. The following prescription I have found of service is these cases:

℞—

Tr. Nux Vomica .....dram 1
Tr. Rumex Crispus .....dram 1
Sat. Aqueous So. of
Potassium acetatis ..... oz. 1
Aqua, qs. ad. ..... oz. 6
Sig—1 dram q. i. d.

The carbon dioxide, alveolar air tension test, put out by Hynson, Westcott & Dunning of Balitmore, Md., I have found very reliable as a definite test of acidosis. Write to them and they will send you complete literature. This line of treatment is valuable in diabetes.

For quick action in uremia, etc., an intravenous injection potassium nitrate 15 gr. to 5cc. followed by one-half hour auto-condensation, watching pulse pressure, etc., is frequently productive of excellent results. I usually give the auto-condensation and a hot pack together.

Diabetes

See acidosis. Don't forget the colon in all cases of acidosis.

Abdominal Adhesions

Locate nature and position by the X-ray. Place over affected area block tin of proper size. Directly opposite place larger block tin and apply diathermy. Always figure to get your heating point as near the area to be treated as possible, adopting the same plan as described under thoracic diseases. Fasten in place with sand bags or elastic bandage and give the proper dosage. Treatment of this condi-

tion usually requires longer time, on account of depth of area to be treated. Soft tissue is not heated as well as dense tissue, and radiation is so rapid in the abdomen I seldom treat a case less than three-quarters of an hour, and frequently an hour or more. Immediately after this I switch to the Polysine, and deliver a comfortably strong surging sinusoidal for five minutes, through the same electrodes. Remember you can use the AC sinusoidal with block tin electrodes but not the galvanic sinusoidals.

NOTE—A common mistake when treating adhesions of the splenic and hepatic flexures is to place the small electrode over the anterior abdomen. This is wrong—if you will remember, the flexures rest on the kidneys. This places them closer to the back than the abdomen. I find the best position of the hepatic and splenic is on the side and back for the active electrode, just lateral to the kidneys. I usually figure the heating point as about one-fifth. My large pad is applied directly opposite which would be on the opposite side of the abdomen.

Cirrhosis of Liver

You frequently will be surprised what diathermia of the liver will do for cirrhosis. Place sufficiently large electrodes postero-anterior and give a suitably strong current for one hour; follow with the surging sinusoidal current comfortably strong for five minutes. The next day place proper sized electrodes on each side and treat the same way.

You will often see bad cases of abdominal ascites clear up. The patient pick up in health. Combine this with the proper diatetic and medicinal treatment. While the treatment is not a cure, i. e., you can not put a new liver into a patient—you can arrest the condition and keep them alive and in fair health for an indefinite length of time.

Whenever using the sinusoidals for abdominal, pelvic and thoracic work, remember, to always have them in rhythm with respiration or as near so as possible.

Chronic Colitis with Diarrhoea

Comes under the head of spastic colitis. Is very frequently an indication of ulcerative colitis. Use the sigmoidoscope always. Place the patient in the knee-chest position and examine. In this condition weak solutions of krameria or kino are indicated in conjunction with starch solution.

Correct all signs of splanchnic insufficiency. Put patient on a bland, non-stimulating diet. If ulceration is present the following prescription is of value. Rx.—Nitric acid—15 drops simple syrup qs. ad.—3 ounces. Sig. one teaspoon every two to four hours, according to severity of case.

Use the slow sinusoidal over dull areas, but not while the patient is suffering acute pain. This is best relieved by placing patient on the auto-cond. table and using Tesla coil indirect method, drawing the current out of the painful area, with a gentle circular massage, at the same time applying the 1,500-watt light.

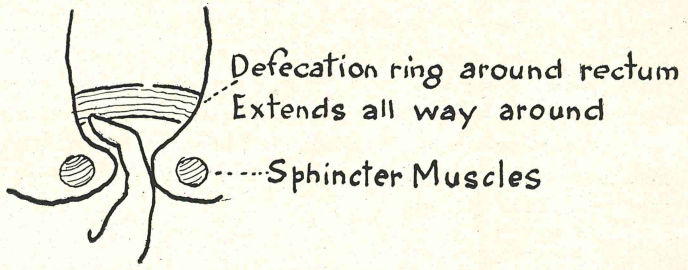
With Constipation

More stress must be placed on the colon and the points of stasis. Use the slow sinusoidal as described. Build up splanchnic insufficiency and treat the colon through the sigmoidoscope using strong solutions of krameria or kino, depending upon the severity of the case.

The one important point in chronic constipation is a deficient *defecation ring*. In reviewing your anatomy you will remember that mention is made of the pectinate line (Hilton's white line), but there is also another ring of specialized nerve endings which to my knowledge has never before been considered. I have termed it the "defecation" ring. It is located well up in the rectum about a joint and a half above the internal sphincter. Pressure along this ring clear around the bowel produces a feeling as if the bowels had to move. The width of this is approximately one-half inch. Normally, when the hardened fecal material strikes this

band, the pressure of the bowel cramping around it elicits this reflex of defecation.

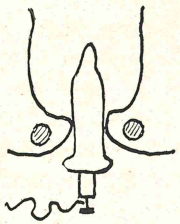
This is of extreme diagnostic value. Insert the well lubricated finger into the rectum. Hook it over the sphincters and make pressure on this ring. If mild pressure produces the desire of defecation, the condition is fairly normal. If a decided pinch is required, the defecation ring is partially obtunded and will require special treatment, or you will never cure your constipation cases, so that they will stay cured.



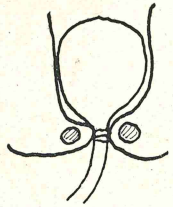
Treatment requires the interrupted rapid sinusoidal, comfortably strong current set at the respiration. Proceed as follows: Insert Neiswangers rectal bag electrode, just inside the rectum so that the upper part of the sphincters grasp the upper part of the bag (see cut). Place a 3 by 5 pad over the 4th and 5th lumbar to catch the defecation center according to Ireland's chart. Strap the respiratory interrupter on, and give the rapid sinusoidal current through this apparatus. Treat three to five minutes, every day until you can demonstrate a decided increase in tone of the defecation ring. Instruct the patient to sit on the stool and strain down gently after each meal, i. e., three times daily, even though he does not have the desire. This is the natural and only way to properly exercise this function. The patient will be surprised how often the bowels will move, even though there is no desire. The first thing he

knows he will start to take these exercises and he will commence to note a desire for movements, just before he sits on the toilet, showing that the function is working up. Don't use a metal dilator or metal electrode as the bulge of the sphincters prevents real good contact with the defecation ring (see cut).

The negative pole of the surging galvanic is also good for this condition.



Metal Electrode - not good method



Neiswanger's bag filled with saline - best method

Splanchnoptosis

Dropping of the abdominal viscera requires treatment along the line of splanchnic insufficiency, for this condition is the result of splanchnic insufficiency. You must build up intra-abdominal pressure in these cases, for intra-abdominal pressure is the force that buoys the organs up into their normal position. The various ligaments merely act as guy ropes directing the position of the organs, at the same time forming the means of supplying blood vessels, nerves, etc., for their sustenance. All organs are movable. They can adjust themselves to varying conditions. The uterus, for example, is freely movable in every direction, but normally always swings back to normal position. Any operation then, with the idea of fixing an organ into its supposed normal position is only creating a new pathology in the attempt to cure an already existing one. Supposing you

were treating a retroverted uterus; remember that some other organ has taken the place the uterus should occupy, and that some other organ has taken the place of the organ that is now taking the place of the uterus, etc., in other words you have to re-arrange the whole abdominal cavity, if you wish to correct a long continued retroverted uterus.

Appendicitis

I am of the opinion, that all severe chronic appendixes should come out, for as they exist they are much more a menace than they are worth. But, however, there are very few people who will stand for the operation unless they are suffering an acute attack, and on the other hand many cases, on account of organic heart disease, etc., are poor risks. We must not tell these cases we cannot help them and thus let them gravitate to the quack and juggler, for we can.

If the case is one of adhesions, which as rule all are, then your indication is diathermia with the D'Arsonval coil. Apply a piece of block tin a little smaller than the area treated which you mark out by percussion and pressure, and another of about three times the area on the back. Give a diathermia dosage according to rule, for 45 minutes to one hour, followed immediately by five minutes of the surging sinusoidal for massage effects. Always tend to pelvic drainage. Every single one of the chronic cases will show colitis.

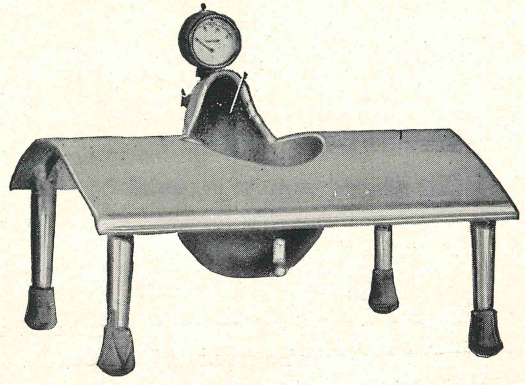
Before starting the treatment, rule out the possibilities of confined pus, with the history and electro diagnostic method.

Many of the conditions found in the abdomen have not been mentioned. However, sufficient has been shown to give you the basis. Remember that all cases are treated under the same principle: Mechanical, chemical and thermal, or combinations just the same as elsewhere. Don't increase your dosage, but increase your length of application. By

this I am referring more to the galvanic and high frequency currents. The sinusoidals I seldom give anywhere over five minutes, as this is sufficient for mechanical action, and if continued too long is liable to be followed by fatigue, for we are exercising independently of the nervous system and are liable to overdo it without the brain being aware of it.

CHAPTER VI

DISEASES OF THE PELVIC VISCERA AND THEIR TREATMENT BY MEANS OF THE WAGGONER PELVICMULTIMODE AND THE McINTOSH POLYSINE GENERATOR



THE PELVICMULTIMODE (see cut) is an apparatus particularly designed so that all of the various physical methods which have been proven of definite benefit in pelvic disease, may be combined and applied at one and the same time, in such a way that the best possible results may be obtained; results that have not been equalled by any other known method of treatment.

We all know of the value of electricity as represented by faradism, sinusoidalism, the galvanic, diathermia, cataphoresis, electrolysis, etc. We know what massage will do; postural treatment, hot and cold irrigation, heat as repre-

sented by the sitz bath, abdominal stupe, intra-rectal, bladder and vaginal irrigations, rectal dilatation, etc., etc. Yet when they are used alone, or improperly combined, too frequently fall short of the mark and do not produce the desired results The Pelvicmultimode combines all of these modalities or any combination, applying them with a definite aim in view, and produces truly remarkable results—which repeatedly surprise the experienced user of the apparatus.

It may be used with any electrical apparatus, regardless of make or kind of current, providing that current is under perfect control. It is particularly well adapted to the Polysine Generator manufactured by The McIntosh Electrical Corporation of Chicago, for which the following directions for treatment are given. (See Page 105.)

The Polysine is an instrument so constructed and arranged that any of the low tension currents required, may be selected and applied with perfect control, by simply turning a selector switch. One feature of extreme value in pelvic disease is the interrupted rapid sinusoidal current, which delivers a current duration of fifty per cent on and fifty per cent rest and may be regulated at any rate varying from ten to 170 interruptions per minute.

In order to understand its application to the Pelvicmultimode a short description of the different currents will be necessary.

1. **Rapid Sinusoidal,** *1,800 cycles per minute.* Note the rapid rise, fall and reversal of voltage producing stimulation with mild treatments and sedation with heavier application. Valuable for relief of pain. Utilized for eliciting spinal reflexes and stimulation of muscular tissue. Far superior to faradic current for general use.

2. **Interrupted Rapid Sinusoidal,** *10 to 170 periods per minute.* Some authorities claim that in certain conditions in pelvic disorders that an abruptly interrupted rapid sinusoidal current has an advantage over the symmetrical form of the surging sinusoidal. Some writers recommend this

For tracing, see p. 19.

mode to be applied at a rate four times the respiration advocating this treatment for the eyes and for infantile paralysis.

3. **Slow Sinusoidal,** *10 to 170 cycles per minute.* Referred to by many writers as the galvanic-sinusoidal mode. The current par excellence for gastro-intestinal work. It is especially adapted to excitation of unstriped muscular tissue; an excellent massage for the colon.

4. **Surging Sinusoidal,** *20 to 380 cycles per minute.* A compound sine wave conbining the rapid and slow modes in one. Produces deep muscular contractions. Applied at the seventh and eighth dorsal vertebrae it produces rhythmical contractions of the abdominal muscles and is indicated in splanchnic neurasthenia, gastroptosis, enteroptosis, etc.

5. **Superimposed Wave.** *10 to 170 cycles per minute.* This consists of the combined galvanic and sinusoidal current sent through the rotor. It is much more tonic and stimulating than the slow sinusoidal and can be used to good advantage in auto intoxication, arousing the sluggish colon into action.

6. **Combined Galvanic and Sinusoidal,** *1,800 cycles per minute.* In gynecology one can use this current to advantage employing the polar effects of galvanism and the tonic action of sinusoidal current in one treatment. Many other uses will suggest themselves.

7. **Slow Surging Galvanic,** *20 to 380 periods per minute.* This current has practically the same sensation as No. 3 slow sinusoidal, but it does not reverse polarity, but maintains its galvanic properties. Valuable in treatment of different forms of paralysis. The contraction can be concentrated at the affected part.

8. **Galvanic.** This modality possesses all of the characteristic effects which have been accredited to this form of current, such as electrolysis, cataphoresis; and may be employed in gynecology, G.-U. work, rectal treatment, facial blemishes or any of the well-known applications of this current.

9. **Interrupted Galvanic,** *10 to 170 periods per minute.* Total degeneration of a nerve is indicated by its failure to respond to this mode; hence, this application forms an important diagnostic aid. A special commutator has been added to the rotor shaft which affords current flow and current break for one-half the duration of each period, thus making a much more accurate interruption than the clock-work rheotomes used on Wall Plates for the purpose.

10. **Diagnostic Lamp.** Practically any auriscope, urethroscope, cystoscope or transilluminator can be lighted to full brilliance and controlled perfectly with rheostat.

Generally speaking we have three conditions existing in the Pelvis, indicating three different modalities of the electrical current.

A.—Mechanical conditions, such as adhesions, infiltrations, misplacements, mechanical obstruction resulting in venous stasis, lack of tone—nervous and muscular, poor cell metabolism and defective pelvic drainage.

The rapid sinusoidal is best suited for this condition. The No. 1 wave, continuous, for the acute, over-irritated reflexes, where sedative effect is required. And No. 2 wave, interrupted, for the atonic, below-par conditions. These interruptions should be made in rhythm with the respiration, as will be explained later.

B.—Infectious and True Inflammatory Conditions, require the polar effect of the Galvanic Current (No. 8) for nutritive, anti-bacterial as well as stimulative and sedative effect.

A brief summary of the action of the positive and negative poles of this current are as follows:

Positive Pole	Negative Pole
1—Sedative, soothes inflammation.	Just the opposite
2—Oxygen and acid pole.....	Hydrogen and Alkaline
3—Stops bleeding.....	Increases bleeding
4—Hardens and contracts tissue...	Softens and disintegrates
5—Vaso constrictor.....	Vaso dilator
6—Highly bactericidal.....	Favors bacterial growth
7—Deposits the salts of copper, zinc or iron in tissues.....	Deposits the iodine from potassium iodide.

C.—Combinations of A. and B. (i. e. mechanical and infectious conditions) are in some cases best treated by No. 6, the combined galvanic and sinusoidal, particularly in acute, irritated conditions, where you want the nutritive action of the galvanic, and the obtunding or sedative action of the sinusoidal.

In other instances where you want the nutritive action with softening, liquefaction or other effects of the negative pole and tonic contractile effect of the surge use No. 7, the Slow Surging Galvanic. However, in cases where the purely Thermal effect is desired, High Frequency is indicated.

At first glance apparently the currents illustrated under sections B and C would be the most indicated in pelvic disease, yet this is not the case. Nearly all pelvic diseases, particularly the chronic ones, while they may have originated from infections, are not dependent upon these conditions for their existence, but purely upon mechanical or pathological conditions, characterized primarily by deficient nerve tone, resulting in poor muscular and cellular tone, prolapse, venous stasis and poor pelvic drainage. There is no current with which we can stimulate or sedate the nervous system,

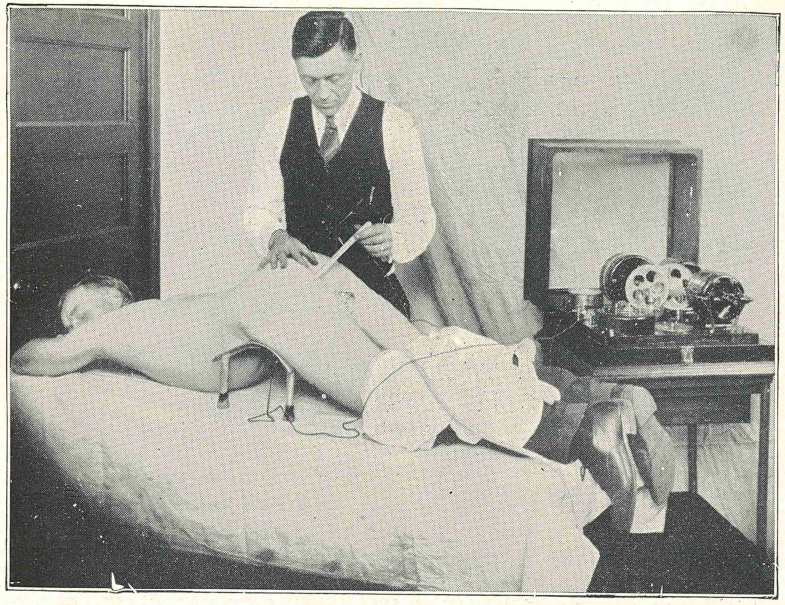
so well as the rapid sinusoidal, and of the two sinusoidals the interrupted is the most often indicated.

To explain—Why is chronic gonorrhea a thousand times harder to cure than the acute, when the microscopic picture of the acute shows millions of germs to one found in the chronic? It is because definite pathological changes have been produced in the chronic stage which are organic in nature and, instead of attacking this condition, treatment is applied against the germ. If we will now apply the proper modalities to restore nerve tone, circulation and consequently restore pelvic function, the chronic gonorrhea will disappear.

GENERAL DESCRIPTION AND APPLICATION

The Pelvicmultimode is a stand like affair finished in white enamel, which sets on the ordinary treatment table. The reservoir of the stand is filled to the brim with hot saline solution, 110 to 120° F. The patient lies over this face down. See that the crotch extension of the reservoir fits snugly against the perineum or crotch. This position is important—the hips are higher than the shoulders allowing the prolapsed organs to assume a more normal position, and gravity aids the return venous flow. The hot saline applies heat to the lower abdomen and perineum, thus combining the effect of the sitz bath and abdominal stupe.

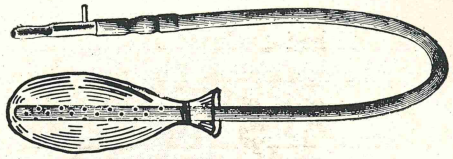
In the general treatment of pelvic diseases, we must always—1. Put the organs back to as near a normal position as possible by digital manipulation, which relieves nerve tension and circulatory obstruction. The position of the patient on the apparatus maintains this condition and utilizes the force of gravity to assist the venous flow. 2. We must increase the blood supply, which is done by the heat and suction. 3. Stamp out existing infections by irrigation, instillations, internal medication and above all the galvanic current. 4. Restore nervous and muscular tone,



which is best accomplished by the sinusoidal currents. The The Pelvicmultimode affords us a means of applying all of these measures combined.

If the disease we are treating is not characterized by much inflammation or if the adhesions, infiltrations, etc. are not too extensive the heat applied from the reservoir of the stand will be all that will be required and the long rectal electrode may be used in the rectum. (See cut.)

If there is a considerable amount of inflammation or the induration is extensive and hard requiring much softening, then intrarectal heat will also be required. This is best applied by using Neiswanger's rectal bag (see cut) which may be purchased from the McIntosh Electrical Corporation or may be made as follows: Cut some small holes at



frequent intervals for a distance of two inches from one end of a piece of rectal tubing six to eight inches long. Procure an ordinary fish skin condom or gold heater's bag, which will allow the passage of the electrical current. If a condom is used cut it about half in two and pull it over the end of the tubing containing the holes and tie it tightly with several turns of strong thread, just above the upper line of holes. Have a brass nipple made to insert in the tubing and to connect with a fountain syringe. A piece of copper or iron wire is fastened to the end of this nipple through a small hole drilled in it, and runs down the rectal tubing, ending about one-half inch from the end in the fish skin bag. Don't have it too long for, when inserting the bag in the rectum, it might punch through and injure the mucous membrane. It is a good plan to twist the end into a little ball with a pair of pliers to prevent this possibility.

On the side of the brass nipple is attached a small brass post in which is drilled a 7/64 hole to receive the terminal from the connecting cord of the electrical apparatus.

To apply it, lubricate well with some K. Y. jelly (never use grease or vaseline when you are employing electricity as it is a non-conductor, causes jump sparks and only irritates your patient). Insert the tubing so that all of the bag is inside of the rectum and connect the nipple with a fountain syringe containing salt solution heated to 140 degrees F. Place the syringe about a foot above the patient and let the solution run into the bag until he can feel the

heat and then clamp it off. About every one or two minutes a new supply should be introduced in order to maintain the heat. This may be accomplished by removing the tubing and letting the contents drain out and then refilling, although the best way is to insert a "Y" tube in the circuit and have a small piece of tubing attached to the free end to act as a drain. All you would have to do then is to clamp off the drain tube when you are filling the bag, and open it when draining off.

We next come to the method of increasing the circulation. Of course the heat applied is a great factor in producing an increase of heat to the parts, but it is not sufficient for good therapeutical results. You will note by examining Pages 101 and 106 that the reservoir with the crotch extension is so arranged that it fits air tight against the lower abdomen and the perineum. On the back of the crotch extension is a nipple conecting to a suction pump (see Fig.). This pump is fitted over any ordinary faucet (push the pump on, don't twist it as this tears the rubber washer of the pump) and as the water is turned on a vacuum is produced in the reservoir which can be increased or decreased, according to the amount of water passing through the pump. On the top of the crotch extension is a gauge to measure the amount of vacuum or suction. It should never exceed four pounds. The amount required for each case depends upon individual tolerance. It should be as strong as can be comfortably borne. Note—if you have the spring type faucet that will not stay open, a half inch rubber band stretched from faucet to faucet will hold it open wherever you want it. The result of this suction is an enforced circulation throughout the whole pelvis which has to be seen to be appreciated.

To stimulate proper nerve and muscle tone, we must use some form of the low tension currents such as faradism or the sinusoidal current. The latter is so far superior to the former that there is no comparison. The current must not be delivered continuously, for if we do we will tire out both the nervous reflex and muscular activity. Practically all of the organs and tissues of the pelvis and abdomen are composed of involuntary muscle which must have its period of rest before contraction. The natural way of producing tone is, that when the diaphragm descends intra-abdominal pressure is increased, which produces a pinch or irritation on the afferent nervous system leading to the abdominal brain (solar plexus) which is transmitted from this center out through the efferent nerves to the various organs, producing tonic contraction. Therefore our interruptions must be in rhythm with respiration. To exercise this natural process the interruptions should be set about two beats slower than the respiration as this gives a longer stimulation, causes the patient to breath two beats slower and deeper, thus producing an increase of the nerve reflex and the muscular contraction, but still not too much to overdo.

To accomplish this attach one connecting cord from the binding post of the Polysine to the binding post on the bottom of the reservoir (see Fig.) and the other cord from the other binding post of the Polysine to the binding post on the rectal electrode. You can at once see that the current is going to pass from the rectal electrode, directly down through all of the pelvic tissues and organs to the water in the reservoir. Then turn the selector switch to the interrupted rapid sinusoidal, and turn the little crank of the rotar wheel to the desired interruptions. By closely examining cut Page 38 you will see a little scale just back of the selector switch which will show you where to set the

rotor for the number of interruptions per minute. The current should then be turned on gradually through the rheostat until you have reached the amount the patient can comfortably stand. Treat the patient five minutes at first gradually increasing from day to day up to fifteen minutes. Treat every day until definite improvement sets in and then less often. When we have painful conditions to deal with, if the pain is due to reflex irritation, the rapid sinusoidal *steady* should be applied for five, ten or fifteen minutes until the reflex is tired out or, as we say, obtunded. If the pain is the result purely of inflammation, then the galvanic current should be used, applying the positive pole against the painful area. If the condition is a combination of both, the combined galvanic and sinusoidal may be used. Usually, however, one of the first two will be indicated.

In cases of adhesions and hypertrophy, the rapid sinusoidal interrupted for stimulation and massage effect may, be used, or better still, the surging galvanic, applying the negative pole against the offending tissue. The only drawback to the latter modality is that frequently too much irritation is produced, in which case it should be left off for a few treatments and replaced by the interrupted rapid sine or, if necessary, positive galvanism, to overcome the irritation, applying the positive pole to the affected part.

DIATHERMY IS BETTER

In cases where nerve irritation is a troublesome factor and a good, deep massage is still required, you will find the slow sinusoidal of extreme value. This current also has quite a bit of nutritional effect as it is composed of the galvanic. However, the polar effect is absent as the waves are first positive and then negative in character.

When using any of the currents containing the galvanic, if the metal rectal electrode is used, a fish skin condom

well moistened inside and out should be slipped on over the electrode before inserting it in the rectum, to prevent electrode from sticking to tissues.

When treating a woman on the apparatus be sure that the reservoir is filled clear to the brim with the saline solution. The same should apply to the male unless concentration of current is required upon the genital organs. (See treatment of Anterior Gonorrhoea.)

When applying treatment to the pelvis, the general treatment should be given every day until definite results are obtained and then less often. You would not expect to give digitalis for a bad heart once weekly and get much results. Special cataphoretic or electrolytic treatments with the galvanic should of course not be repeated until the effect of the previous treatment has subsided.

ACUTE ANTERIOR URETHRITIS (Gonorrhoea)

Reviewing our anatomy of the urethra, we find that the external sphincter is located at the junction of the prostatic and bulbous portions. If we will constantly remember this point and take every precaution possible to prevent extension of infection past this sphincter, the severe, almost incurable, posterior cases we have today will be cut down to the minimum.

If the case is acute and purely anterior, do not put any sounds into that urethra; do not use irrigations, because they are almost sure to extend the infection past the external sphincter; do not give your patient a bottle of medicine and a syringe, or he will do the same. Impress upon him the importance of this point; do not inject oils or oily bougees, for if they obstruct the urethra for only a few minutes, the rapidly produced discharge will back up through the sphincter.

For irrigating effect nature has placed a fountain syringe (the bladder) just above the urethra that beats any that

man has yet invented. Use it. Give them plenty of lemonade. Give them some harmless medicine with instructions to take every hour with a full glass of water. Don't fill these cases up with soda for the sake of quieting down the irritation; a slightly acid urine is normal and also germicidal. Balsam copaiba in five to ten drop doses on sugar after each meal has a decided beneficial action.

Treatment with the Pelvicmultimode has produced some truly remarkable results, clearing up many cases in from one to six treatments.

Instead of filling the reservoir with saline solution as per the usual method, about ten ounces of a four per cent solution of copper sulphate or zinc sulphate, preferably the latter, is heated to 110 to 120 degrees and placed in the reservoir. This is just sufficient to cover the terminal in the bottom of the stand, also as the patient lies on the apparatus it will be noted that the end of the penis ONLY comes in contact with the solution, thus concentrating the current to the spot where we want it. A small piece of cotton is wound on the end of a smooth pointed probe to about the thickness of a match. This is saturated with the zinc solution and inserted in the penis about one-half inch, leaving some dangling out as the probe is removed. This acts as a wick to keep the solution applied to the urethra and also as a leader for the positive pole of the galvanic current. Place the patient on the apparatus, start the suction—usually about one-half pound is all that will be tolerated in the acute cases. Insert Neiswanger's rectal bag connected to the hot saline solution. Attach one cord from the Polysine to the terminal on the bottom of the stand, and the other to the rectal electrode. Turn the knob marked pole changer, so that the positive pole will be at the terminal of the reservoir and the negative to the rectal electrode. Then slowly turn on the current through the

rheostat until the milliampere meter registers about five M. A. Treat for about seven minutes and follow with two or three minutes of the rapid sinusoidal, interrupted and very mild—just so they can feel it—for tonic effect. Repeat the treatment every day until better, or a reaction is produced.

Follow the treatment with instillation of a solution of zinc sulphate and chloral hydrate (of each, two to five grains per ounce), depending upon the amount of irritation produced. The proper method for instillation is to cut off the last three inches of a number twenty F catheter and slip it on the end of a Luers all-glass syringe.

The positive pole is germicidal. By the process of cataphoresis we deposit zinc salts in the tissues about the urethra. The positive pole is also a vaso-constrictor, relieving the inflammation. It is also sedative relieving the pain. Do not use large amount of current; 2-5 milliamperes is just as effective as large doses and avoids the danger of over-action, which only increases the irritation.

ACUTE POSTERIOR URETHRITIS

This condition is also best treated with the galvanic current. Fill the reservoir to the brim with saline solution heated to 110-120 degrees. Insert Neiswanger's bag and inject into it three or four ounces of four per cent zinc sulphate, and clamp off. Attach cords from the Polysine to the terminal on reservoir and binding post on rectal electrode. Turn knob of pole changer so that the positive pole is delivered to the rectal electrode and the negative to the reservoir, which is just opposite to the method of treating the acute anterior cases. Turn selector switch to the galvanic current. Now run rheostat forward until meter registers ten milliamperes. More current can be used here, as it is discharged over a larger surface. Treat seven

minutes and follow with three minutes of the interrupted rapid sinusoidal, very mild for tonic effect.

Follow these cases with posterior irrigation of a 1 to 10,000 potassium permanganate solution. You may also give them a bottle of zinc sulphate and chloral hydrate, two grains each to the ounce, to use as an irrigation, three times daily. Give the Balsam copaiba after meals and instruct them to drink lots of water. They of course should be restricted to a non-stimulating diet and beverage, the same as the anterior cases.

CHRONIC GONORRHEA

There are two main reasons why chronic gonorrhea is so hard to cure: 1—The germ has invaded the prostatic ducts, the ejaculatory ducts, the prostatic utricle, the deep follicles of the bladder, etc., where the ordinary methods used will not reach them. 2—Due to the irritation, organic changes have been produced against which no particular treatment is directed, i. e., too much attention is paid to the infection and not enough to the existing pathology.

So important is this last point that if we will direct attention to the pathology and restore it to normal, we will almost invariably find the gonorrhea clearing up, without any particular anti-gonorrheal treatment.

Heat and electrical massage are the great factors required to overcome the trouble, although if the microscopical pictures show an abundance of germs the galvanic should be employed the same as for acute posterior urethritis, with the exception that instead of using the positive pole we must employ the negative, because we want the stimulating and nutritive effect. A ten per cent solution of potassium iodide is used in the rectal bag, and ten milliamperes are given for seven to ten minutes.

Diathermy Is Frequently Indicated In These Cases

The surging galvanic is also of great value in these cases. Insert Neiswanger's bag same as usual, attach to fountain syringe, containing hot saline solution. Turn selector switch on Polysine to surging galvanic. Turn pole changer so that the negative pole is delivered to rectal electrode. Screw crank of rotor out so that twenty waves per minute are delivered, and then turn current on through rheostat until you reach the strongest amount the patient can comfortably stand. Do not give it strong enough to irritate.

On alternate days it is a good plan to give a treatment, using the rapid sinusoidal interrupted at two beats below the respiration. At first five minutes will be sufficiently long. If they complain of being tired, it usually is a good sign that they have had enough. Gradually increase the length of time until they can take ten and fifteen minute treatments. Give the treatments every day until definite improvement is noticed and then less often. The average case will take about three months. Occasionally you will strike a case of chronic gleet, showing just a little pus in the morning, which does not respond to treatment, so, if after three weeks' treatment definite improvement is not noticed, it is a good plan to send them to a competent urologist for examination, as they may have a granuloma, or other organic lesion requiring particular attention.

A good follow-up treatment is to instil into the posterior urethra about ten drops of a saturated solution of Picric Acid. If the microscopical picture shows an abundance of colon bacili, a paste, made by dissolving three of Hynson, Westcott and Dunning's Bulgaria tablets in a little glycerine and water, is almost specific. It can be injected into the bladder with impunity.

ACUTE DIFFUSE GONORRHEA

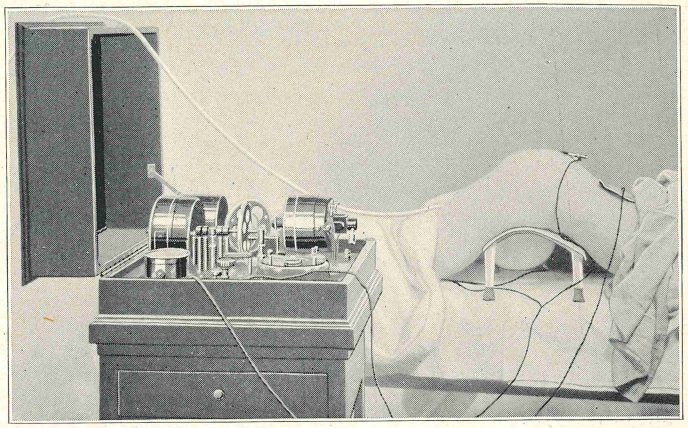
The preceding methods are good if the case is simple and not diffuse in character. If the latter is the case, and it frequently is, a somewhat different technic brings better results. The stand is prepared as for acute anterior urethritis, with hot water to which is added sufficient copper solution to turn water a decided green. The patient is then put in position, and Neiswanger's bag inserted also filled with copper solution. A large pad about five by seven is now thoroughly moistened and placed on the back. The negative pole of the galvanic current is attached to this pad. A bifurcated cord from the positive pole is attached, one end to the binding post of the reservoir, and the other to the rectal bag. By this way we get the polar effects of the positive, both through the reservoir and the rectal bag and at the same time cataphoresis. Give ten to fifteen milliamperes for seven to ten minutes. You, however, have to go by the sensations of your patient. Treat every three to five days according to reaction and results. See descriptive cut.

CHRONIC DIFFUSE GONORRHEA

The same technic is used as for the acute, with the exception that potassium iodide or else Dakin's solution is used in the reservoir and rectal bag, and the positive pole is attached to the pad on the back, while the bifurcated cord is attached to the negative pole, just the opposite of the method for the acute. Otherwise treatment is about the same. Occasionally, I use diathermy in place of the negative galvanism. In both cases I usually follow the treatment with a few minutes of the surging sinusoidal for massage effect.

EPIDIDYMITIS AND ORCHITIS

These conditions may be included under one head, as they are almost always a combination of each other and the treatment on the Pelvicmultimode is practically the same.



Pelvicmultimode in Chronic Diffuse Gonorrhea. Positive Galvanic Bifurcated cord attached to Neiswanger's Electrode with Fish Skin Bag and Reservoir of Stand, Negative Galvanic to Pad on Back.

The acute condition should be treated with absolute rest in bed, the application of heat, poultice, of which pneumophthysine is excellent, and plenty of good elimination. Soda enemata at six to eight hour intervals should be given. As soon as the acute irritation subsides, temperature has gone down, etc., they should be put upon potassium or sodium iodide internally to hasten absorption, and treatment started on the Pelvicmultimode.

The reservoir of the stand should be filled to within one inch of the top with hot saline solution; a particularly good saline solution for this condition is to put a heaping

tablespoonful of Epsom salts in the water in the reservoir. Start suction, giving them just enough so they can feel it —about one-half pound. Insert Neiswanger's Rectal Bag, attach the fountain syringe with hot saline solution. Turn the selector switch to the slow sinusoidal. Turn the crank of the rotor so that two waves less than the respiration are delivered, and turn the current on through the rheostat, just sufficient to be comfortably felt. If this causes pain, switch off the rheostat, turn the selector switch to the straight galvanic, turn the pole changer so that the positive pole is delivered to the reservoir of the stand, and turn on the current gradually through the rheostat; don't exceed ten milliamperes. If this causes pain, then you have a sure sign that you have pus confined in the epididymis or testicle, and surgical interference is indicated to give it drainage. This same diagnostic method is of value in cases of salpingitis, indicating the presence or absence of pus. After the case has advanced to the point where practically all inflammation and soreness has gone, and the hard, indurated epididymis is left, the surging galvanic is then indicated, delivering the negative pole to the reservoir of the stand and the positive to the rectal electrode. On alternate days it is a good plan to switch to the rapid interrupted current. This current very often is irritating to the penis, in which case it is a good plan to put a rubber condom on the penis, which acts as a non-conductor and cuts that organ out of the circuit. Gradually work these cases up to fifteen-minute treatments.

Acute orchitis or epididymitis is best handled by bringing the affected organ clear up on the abdomen and strapping in this position. When the patient stands, drainage is then downward from the organ, and usually in two or three days the irritation will leave. Of course after pus is formed, and the patient has a high temperature, then rest in bed is indicated.

In the chronic conditions it is frequently, a good plan to alternate the surging galvanic with diathermy followed by the surging sinusoidal.

ATROPHY OF TESTICLE

Many cases of atrophy of the testicle can be brought to normal by using the Pelvicmultimode with the interrupted rapid sine set at the rate of the respiration. Gradually work them up so that they will take three or four pounds suction, the idea being to increase the blood supply as much as possible. Treatment should be given three times weekly and will have to be continued anywhere from three to six months. Surging galvanic, negative to reservoir is better.

IMPOTENCY

Generally this condition is secondary to some other pelvic trouble, particularly prostatic, and usually disappears when the cause is eradicated. However, there is a special technic to be followed when this condition is the prime object of treatment. Fill the reservoir a little less than half full, and give the suction as strong as they can stand it, never exceeding four pounds. Insert the ordinary rectal electrode, covered with a well moistened fish skin condom and connect the cords from the Polysine to the electrode and reservoir of stand. Turn selector switch to the slow sinusoidal. Turn the rotor wheel out to the required rate which should be two beats less than the respiration, taken while lying down. Give the current as strong as can be comfortably borne. Treat ten to fifteen minutes.

As the patient feels the current coming, have him strain down as if he were expelling urine. After a few minutes of this he will become tired. Continue the treatment on the apparatus for the required time but have him discontinue the straining for that sitting. In conjunction have him take the proper endocrines. The Adrenospermin Comp.

(Harrowers) if there is hypotension, or the Thyro-pancreas comp. with spermin if he has hypertension.

ACUTE PROSTATITIS

If gonorrhoeal, use the same treatment as given under acute posterior urethritis, i. e., use Neiswanger's bag with copper or zinc sulphate and the galvanic current, positive pole applied at the rectal electrode. Always follow these cases with two or three minutes of the interrupted rapid sinusoidal for tonic effect. Hot soda enemata at six to eight hour intervals is of value. Abbott's Prostatic suppository with directions to insert at night on retiring is of benefit. If the galvanic current even in small dosage causes pain, be very suspicious of abscess formation. The acute symptoms generally subside very quickly from this treatment. Do not discharge your patient until a thorough examination has been made, however, as the majority of these cases are acute exacerbations of chronic inflammation.

CHRONIC SIMPLE PROSTATITIS

Regardless of the cause, the prime thing to attack in this condition is the pathology. Potassium permanganate irrigations may be used to advantage. Strength 1 to 10,000. After which place them on the Pelvicmultimode and either use the rapid sinusoidal interrupted or the slow sinusoidal, set at two beats less than the respiration. If gonorrhoea is the cause or any other infection is present, the galvanic current is of value. As this condition is chronic you may use the stimulating effect of the negative pole through the rectum, using Neiswanger's bag and potassium iodide. However, you will get, as a rule, better results by sticking to the rapid sinusoidal interrupted, because when circulation and nerve tone is restored what little infection may be present is usally exterminated without special treatment for it.

ENLARGED PROSTATE

The enlarged prostate is not, as was supposed, the product of inflammation. Over fifty per cent of these cases will give a negative past history of genito-urinary infection, and will say the trouble dropped upon them from a clear sky. The condition is a degenerative process characterized by adenamatous growth and connective tissue infiltration. The prime cause is due to what may be termed profound pelvic insufficiency. Inflammation of the sigmoid flexure is probably the prime factor in the causation of the pelvic insufficiency. Examination will show the bladder wall greatly enlarged, yet its expulsive power is practically nil, showing the marked atrophy. The plexus of Santorini (blood vessels in false capsul of prostate) will be enlarged four or five times its normal size. The rectum and sigmoid will show similar changes. As a result of the general stasis the heavily loaded organs, atonic in character, press one upon each other interfering with circulatory and nerve function, thus increasing the difficulty.

Treatment must be directed not so much against the prostate as the whole pelvic region. If muscular atrophy of the bladder has not advanced too far, and if we can restore its function, every one of these cases will be symptomatically restored to normal, even though the prostate itself be destroyed. There is no possible way to tell how much actual destruction has taken place, for you will frequently see cases of long standing in patients as old at 85 responding to treatment, while another at the age of 60 and in fair general health will not respond so readily. Usually those cases who have gone without much catheterization, resulting in a constantly over distended bladder are the slowest to respond. However, every single case that will stick to you and take treatments properly given, will show benefit and usually benefit perfectly satisfactory to both the patient and physician.

The condition is primarily a mechanical one although, of course, we almost always have secondary inflammations to deal with, the most troublesome of which is the bladder. Potassium permanganate irrigations two to four times weekly are of value to clean out the debris. If the colon bacillus is in abundance, and it usually is, a solution composed of one-half ounce warm water, two to four Bulgaria tablets (as marketed by Hynson, Westcott & Dunning of Baltimore, Md.) and one-half teaspoon of glycerine, has a wonderful effect, cleaning up the incrustations, ousting the colon bacillus and quieting down the irritation and tenesmus. A similar procedure must be undergone in the rectum and sigmoid for we have almost a similar condition to deal with. Only instead of using the water dissolve four to six Bulgaria tablets into one ounce of Kino Glycerate (sold by the Ball Specialty Co., of Cedar Rapids, Iowa) and inject this high up as possible to be retained. Usually three times weekly is sufficient for these treatments.

Treatment on the Pelvicmultimode is of prime importance. We must restore pelvic drainage, circulation and general tone.

Fill the reservoir of the stand with hot saline solution, make it as hot as the patient can stand. We must use all the heat we can in these cases. Put four to six ounces of water 120 degrees in the bladder. Insert Neiswanger's rectal bag and connect with the fountain syringe containing saline solution heated to 140 degrees. If the prostate is hard and nodular, turn the selector switch to the surging galvanic and deliver the negative pole to the rectal electrode. The slow sine is also of value in this condition. However, the majority of these cases will show a markedly enlarged prostate, with swelling of the tissues of the pelvis, and the rapid sinusoidal interrupted two beats less than the respiration is indicated. A rubber condom will probably have to be drawn over the end of the penis, for usually

these cases have an irritated urethra and the currents irritate that organ. Treat these cases three to five minutes at first, gradually increasing the length from treatment to treatment until fifteen to twenty are taken. Treat them every day until definite improvement is noticed and then less often.

The galvanic current may be employed when polar effect is required although this is usually taken care of with the surging galvanic. If a large, boggy prostate is felt the contracting properties of the positive pole is of marked benefit, usually, however, we want to relax and soften up the indurated tissue instead of contract it.

If the patient is in the habit of catheterizing himself, which these cases should do as long as there is any retention to speak of, have him follow the procedure by injecting an ounce of water containing one-half to one dram of picric acid saturated solution.

Treat these patients religiously. Three months to a year may be required and, as long as you can see improvement, it should be an encouragement to continue. The great trouble is that both the patient and physician give up too easily

ACUTE AND CHRONIC CYSTITIS

Acute cystitis is best treated with the galvanic current using Neiswanger's bag and heat per rectum, with the positive pole attached to the rectal electrode. In the severe cases treatment may be given twice daily. As the acute symptoms subside gradually add a few minutes of the interrupted rapid sine, very mild for tonic effect. If much pus and debris is present, irrigations with hot boracic solution is indicated. Give these cases internally one-half to one dram of a one per cent solution of Tr. Belladonna and Tr. Cantharis each, every 2 to 4 hours. Give the heat in the Pelvicmultimode as hot as can be borne, but do not

give the suction too strong, about one pound, just so they can feel the pull.

Chronic cystitis requires the same treatment as outlined under the treatment of the enlarged prostate. If the colon bacillus is in abundance use the Bulgaria tablets. If the urine is alkaline give 5 grain doses of benzoic acid four times daily until corrected. Apply all of the modalites of the Pelvicmultimode as strong as can be taken. The interrupted rapid sinusoidal and the surging galvanic, negative pole per rectum are most often indicated.

NEPHRITIS

The Pelvicmultimode has repeatedly proven to be a wonderful aid in acute and chronic Brights disease, recovering cases which would have succumbed otherwise. Many a hopeless case will be benefited with the apparatus combined with proper general treatment.

First and always relieve the circulation, taking as much of the load off the heart as possible. Treatment on the Pelvicmultimode is as follows: Fill the reservoir with hot saline solution, place patient on apparatus and start suction giving them all they can comfortably stand, which varies according to the strength of the patient. Instead of using the rectal electrode the hand pad (3 by 5 inches) is placed over the spine in the region of the kidneys. If the condition is acute the galvanic current straight with the positive pole attached to the pad is indicated. Give them all the current they can stand. It is a good plan to have them wash the lower abdomen and crotch with soap before getting on the apparatus in order to remove as much grease from the skin as possible to prevent burning of the skin—from the negative pole through the water in the stand—as strong currents are to be used. Instead of using the saline solution it is sometimes a good plan to use a hot soapsud solution in the reservoir. Treat them from five to fifteen

minutes, as much as they can stand without tiring. Follow the galvanic with three to five minutes of the interrupted rapid sinusoidal. Always turn the galvanic current on and off slowly.

If the case is a chronic nephritis the surging galvanic is indicated applying the negative pole on the lumbar pad. Diathermia from the high frequency apparatus is of distinct value in these cases also. Occasionally give them a treatment using the rapid sinusoidal, interrupted with the respiration.

LUMBAGO OR BACKACHE

Usually one treatment will relieve backache, but of course it will return until the underlying cause is removed. For this condition the rapid sinusoidal steady for five, ten or fifteen minutes until relief is indicated. Galvanism may be used but the rapid sine as strong as can be taken is of greater value. Apply the lumbar pad over the region of the soreness and hold in place with a sand bag. Attach one cord from the polysine to the pad and the other to the reservoir of the apparatus the same as for treating nephritis. Examine the pelvis well and treat what you find, for trouble here is the usual cause of backache.

SCIATICA

Pick up any good book on therapeutics and turn to sciatica. Every writer will invariably tell you to be sure and examine the rectum, for the original cause is usually there, yet how many follow this advice?

The Pelvicmultimode will give instant relief and usually clean these cases up in a very few treatments. Proceed as usual filling reservoir with hot saline, etc. Instead of using Neiswanger's rectal bag, the long rectal electrode is inserted (see Page 106). There are just two currents to be used in this condition—the rapid sinusoidal interrupted for

chronic conditions and the steady current for the acute. If the condition is acute, connect the cords up from the Polysine to the continuous rapid sinusoidal and turn the current on through the rheostat or current controller as strong as the patient can stand it. Now direct the end of the rectal electrode toward the affected side, pressing it in firmly on about a line with the anterior superior spine of the illium, as you slowly feel around, being careful not to use too much pressure to hurt your patient, the leg will suddenly stiffen showing that you have located the sciatic. Continue the current until the leg completely relaxes, showing that the sciatic is obtunded. When this stage is reached, the patient is usually free of all pain. Follow the treatment with two or three minutes of the slow sinusoidal for tonic effect. If the sciatica is chronic use the same procedure, only use the rapid sinusoidal interrupted at about forty interruptions per minute. Give as strong as the patient will let you. The surging galvanic, negative pole per rectum is good to follow up for metabolic effect. For painful spots afterward, the 3 by 5 hand pad may be used. Turn on the rapid sinusoidal current and massage down the course of the sciatic, paying particular attention to the sore spots.

Mortons Neuralgia will respond to the same method of treatment.

Double sciatica when acute is best treated with the Neiswanger's bag intrarectally with hot saline 140 degrees and the galvanic current, positive pole to the rectal electrode. Follow up with rapid sinusoidal and the hand pad going over the course of the sciatic. In double chronic sciatica use the surging galvanic with the negative pole delivered to the rectal electrode. When using the galvanic for the acute, about ten milliamperes is all that will be required.

FEMALE DISEASES

(Dysmenorrhoea)

Practically every case will respond regardless of cause, to treatment on the Pelvicmultimode, although, of course, permanency of results depends upon removal of the cause.

It is practically always the result of reflex irritation. Even in the obstructive type this holds true. A hooded clitoris must be taken care of. Don't overlook a careful examination of the anus. The rectal sphincters and the uterine work on the same nerve system and irritation of one is liable to produce irritation of the other. The same holds true of the bladder sphincters. Rectal ulcers, cryptitis, papillae, contracted muscles, etc., should be properly taken care of. Mal-positions and inflammations of the endometrium must be treated.

Fill the reservoir in the usual way, only be sure that it is clear to the brim in order to be sure of good contact of the water to the skin. Introduce Neiswanger's bag in the rectum and connect to the fountain syringe containing hot saline. Start suction. Turn selector switch of Polysine to galvanic current. Turn pole changer so that positive pole is delivered to the rectal electrode and turn current on through controller until about ten milliamperes are given. Treat for ten minutes. If the galvanic current causes pain, *look for a pus tube.* Another method is to use the rapid sinusoidal continuous as strong as can be borne for ten to fifteen minutes, thus tiring out or obtunding the reflex.

AMMENORRHOEA

Look for cause. Build up the general system. Use the long rectal electrode, particularly if the uterus is infantile in character. The rapid sinusoidal interrupted at two beats less than the respiration is indicated. Mechanical vibration produced by pressing an electrical vibrator against the end

of the long electrode is also of service. Treat every day until results are produced.

Many cases of delayed menses are due to improper development, mal-positions, misplacements, etc., and will recover when these conditions are taken care of. Correct anemia; look out for tuberculosis; overcome endocrine disturbance, etc., and rule out the possibility of pregnancy.

MAL-POSITIONS

Practically all of the mal-positions may be taken under one head, as the treatment on the Pelvicmultimode is practically the same. Practically all of these cases can be benefited permanently by the Pelvicmultimode in conjunction with proper tamponade, suitable treatment of existing inflammations and attention to the general pelvic health. Length of time required varies anywhere from two weeks to six months, depending upon proper diagnosis, response to treatment and more particularly to whether or not the misplaced organ can be manipulated into proper position. If there are adhesions present holding the organ out of position, treatment will usually be long. If the organ cannot be reduced to somewhere near normal, then a large share of the good results from treatment will be lost because a mechanical obstruction exists which works directly against your efforts to restore pelvic drainage and tone to the sluggish organs and ligaments.

If flexions are present and due to the long continued position connective tissue has formed, direct treatment with the galvanic using the negative pole, according to Neiswanger's method, is required to soften up and disintegrate the tissue. The method is as follows:

Moisten an abdominal pad, cover with a good lather of soap and place on the patient's abdomen, connecting the positive pole of the galvanic current from the Polysine to this pad. Then through a vaginal speculum insert Neis-

wanger's intrauterine electrode (see Fig. 6) against the obstruction and turn on three to five miliamperes of current. Treat for ten minutes. Follow with the rest of the required treatment. This treatment should not be applied oftener than every three or four days, while the rest of the treatment should be given every day or at least three times weekly.

The first step is to reduce the mal-position by manual manipulation. If the condition is retro-flexion or version, place the patient in the knee-chest position, insert one or two fingers in the vagina, double up the fist of the other hand and press up on the abdomen until the cervix is forced under the fingers of the vaginal hand. Catch one finger under the anterior lip and pull the cervix back and toward the perineum, then with the other fingers of the vaginal hand, open the vagina so that the air can rush in as you suddenly release the abdominal hand. This will replace most retro displacements providing the fundus is not caught under the promontory or is not bound back by adhesions. If two or three attempts do not replace it, put the patient first on the right and then the left Sims position working with the abdominal hand laterally and assisted by the vaginal hand, in the attempt to push or work the body of the uterus around the promontory. If you cannot get it back and if it seems fairly rigid you unquestionably have adhesions.

Having replaced the uterus to as near a normal position as possible tampons must be inserted through a vaginal speculum to hold it in position. The methods originated by Dr. Harper of Pittsburg, Kansas, give the best results. A short outline of the technic is as follows: Make two tampons both about as long as the thumb, one only about half as

thick as the other. The first one should be about as thick as the thumb. Having reduced the uterus place the smaller one up in the fornix on the side of the dislocation. The larger should be placed in the fornix opposite the dislocation, i.e., if the case is one of retroversion, the small tampon is placed in the posterior fornix and the large one in the anterior. The tampons must not be so large that they will slip out of the fornices, but still large enough to exert the required pressure. After insertion they will make a ring around the cervix. Remove the speculum, being very careful not to displace them by the blades. The mechanics of this tamponade is that the larger one exerts pressure against the cervix which tends to rotate the cervix on the smaller one as a fulcrum, thus swinging the body of the uterus forward. If there is any prolapse of the uterus, a small bell shaped tampon made of wool wrapped with cotton may be inserted.

Having reduced and tamponed the uterus, place the patient on the treatment apparatus, having filled the reservoir in the usual way. Either the slow sinusoidal or the interrupted rapid sinusoidal may be used, setting the number of interruptions two beats slower than the patient's respiration.

If the case is one of adhesions and you cannot reduce the uterus, reduce as much as possible, tampon and place her on the apparatus. In this case the surging galvanic with the negative pole delivered through Neiswanger's rectal bag is indicated. Apply the hot saline solution through the fountain syringe to the rectal bag. The heat and negative pole tends to soften and disintigrate the adhesions, while the surge gives the massage effect.

Leave the tampon in place until the next day. Remove the tampon yourself, irrigate the vagina with a good antiseptic douche, replace the uterus, tampon and repeat treatment on the Pelvicmultimode. One to three months will cure the average case. After the uterus gets accustomed to

its normal position the tampon may be left out, but the tonic treatment should be continued twice a week for another period.

SUBINVOLUTION

The enlarged, boggy uterus, which after childbirth does not return to normal, is almost analogous to the enlarged prostate found in the male.

Pelvic examination of the rectum, bladder, sigmoid and other pelvic organs shows them to be in a similar condition. Treatment must be instituted that is going to correct all of the pelvic disturbance, if much benefit from the subinvolution is to be expected.

First see that the organs are placed in as near a normal position as possible by digital manipulation, then place the patient on the apparatus. Insert Neiswanger's rectal bag high up in the rectum so that you are sure that it rests well over the uterus. Start suction, giving her all that she will stand. Connect the fountain syringe containing hot saline solution to the rectal electrode. Attach the cords from the Polysine to the stand and rectal electrode. Turn the selector switch to the rapid sinusoidal interrupted. Turn the crank of the rotor wheel out so that a number of interruptions per minute is given which is two less than the patient's respiration when lying down. Turn the current on through the controller until the strongest amount the patient can comfortably stand is given. Treat five minutes at first, gradually increasing to ten and fifteen.

Practically all of these cases show chronic inflammation of the vagina, uterus, rectum and bladder. If the colon bacillus is present use the Bulgaria tablets as recommended under the treatment of the chronic prostate. Three to six months are required to completely restore to normal.

UTERINE FIBROMA

You will be repeatedly surprised at the rapidity and amount of reduction that will take place from treatment on the Pelvicmultimode. Case after case will respond even though you have a tumor mass filling the whole pelvis. Treatment is essentially the same as when treating the sub-involuted uterus.

The rapid sinusoidal or the surging galvanic. The latter is of particular value when the tissue is very hard and you want the softening effect of the negative pole. Sub-peritoneal fibroma should be treated surgically only.

PELVIC ADHESIONS

Many cases will present themselves to you who have undergone several operations and have a big mass of pelvic adhesions, with all the characteristic symptoms which makes of them almost an invalid. While you cannot expect to restore them to normal, still you can soften up and liberate many of the adhesions, so much so that your patient will be able to resume her daily duties.

The following case report will serve as a good example, both as to what can be done for them and also the proper treatment.

Case—Female. Age 44. Post-operative adhesions. Had three operations, with return each time worse than before. All of the pelvic organs were swollen and very tender, and bound down in a rigid mass. Backache was severe. Could not stand on her feet five minutes without feeling faint. Unable to do any work whatever. Neiswanger's rectal bag was used and the steady rapid sinusoidal was given the first three treatments, i. e., until the acute irritation had subsided. After which the rapid sinusoidal interrupted at two beats less than her respiration was used. After the 10th treatment she slept all night and said that she never felt better in her life. After the 23rd treatment she was able

to resume her household duties and was symptomatically cured.

Cases of this kind may have to come back from time to time and take additional treatments, although the case mentioned above has had but one treatment in over one and one-half years' time.

Use plenty of heat in the rectal bag. This, combined with the powerful massage effect of the rapid sinusoidal, seems to have better effect than using the galvanic or surging galvanic. Have water in reservoir hot and give the suction strong.

PUS TUBES (Salpingitis)

As long as there is any active pus in the tubes they should not be treated on the Pelvicmultimode. If you are suspicious of active pus, put them on the apparatus. Insert the long rectal electrode well in the rectum against the affected side, and turn on the galvanic current, positive pole to the rectal electrode. If pain or distress is produced, you have almost an absolute diagnosis.

They should then be treated by rest in bed, the usual abdominal stupe and irrigations, etc., and after subsidence of acute symptoms, surgical interference.

If the condition, however, is a chronic one and the tubes are draining well through the uterus, much may be accomplished on the Pelvicmultimode. For this the rapid sinusoidal interrupted two beats less than the respiration, gives the best results. Before beginning each treatment, it is a good plan to test out the patient with the galvanic to see that the infection is not flaring up. Use Neiswanger's rectal bag with heat from the fountain syringe.

Rectal disease, such as proctitis, soft hemorrhoids, prolapse, sigmoiditis, appendicitis, and in fact any condition of an inflammatory or obstructive nature will respond to the proper combined treatment on the Pelvicmultimode.

However, it must be used and applied with reason. The proper diagnosis is everything. Don't give any kind of treatment for a disease, no matter where located, unless it is applied with a particular aim in view. To explain: if the case being treated were an acute prostate and the negative pole were applied per rectum, the case would be aggravated. Or if we had a case of dysmenorrhoea due to reflex irritation from some rectal papilla, to treat them on the apparatus and not remove the papilla, would not be productive of much success.

When applying the Pelvicmultimode, do not rely too much on the meters. The patient's sensations are the best meters to go by. The meters are of more value to tell whether the current is being delivered constantly, etc. The exception to this is the galvanic. Patients will often accept more of the continuous current than they should have. A good rule to follow is that small dosage over longer periods of time is productive of better results than large dosage of short intervals.

Uterine Hemorrhage.

There is no single remedy that will so satisfactorily check uterine hemorrhage, either menorrhagia or metorrhagia, as will positive galvanism.

Technic—Insert a small copper ball electrode wrapped in cotton soaked in salt solution against the uterus in the vagina and connect to the positive pole of the galvanic current. Connect the negative pole to a pad, usually 3 by 5 and place on the abdomen. Turn the current as strong as can comfortably be borne up to 20 ma. It is not necessary to exceed this amount. Treat until hemorrhage is checked. Give the patient ergot to maintain the effect.

Be sure that all retained membranes, etc., are removed. Don't fail to institute treatment for existing chronic endometritis.

Fibroids.

Are best treated on the Pelvicmultimode. Insert the rectal bag electrode in the usual manner and connect to the positive pole of the galvanic current. The negative to the reservoir of the stand. Give five to ten milliamperes for five to ten minutes, according to sensations of patient.

Many of these cases are markedly benefited on the Pelvicmultimode by simply using the interrupted rapid sinusoidal current in rhythm with respiration; just why, I can't explain. The positive galvanic produces results in that the vaso-constriction tends to starve the tumor. Results can also be obtained by using an ordinary electrode in the vagina and a pad over the abdomen. In this case, as you do not want cataphoric action, a carbon electrode is best. However, results are not nearly as satisfactory as with the Pelvicmultimode.

A Copper Ball Vaginal Electrode

A Carbon Electrode

CHAPTER VII
PAPILLOMA

Calls for destructive treatment and can be handled by negative galvanism by inserting a needle connected to negative pole into tumor near its base, the positive pole being attached to the usual abdominal pad. This method is slow and somewhat painful.

Fulguration is our best method, either by the direct or indirect. Personally I like the latter, as I can control the current much better.

Indirect—If the papilloma is in the bladder, I run my fulguration wire down through the catheter guide and plunge it into the tumor. Then turn on the Tesla current, connected to the couch on which the patient is lying. I do not touch the cystoscope after turning on the current. I have it propped up with towels, etc., at an angle or position where I can look in. I then grasp the bare fulguration wire in one hand, having previously placed the other hand on the patient's abdomen. I then slowly take off my abdominal hand, one finger at a time, until the tumor turns white. I then immediately let go of the fulguration wire which cuts the current off. The same process is followed in the rectum and sigmoid through the sigmoidoscope, only in this instance I use a long aluminum applicator sharpened to a needle-like point. The vagina is handled through the speculum in a similar manner. I usually run the probe through a catheter to insulate it. This same method I use for cysts of the cervix. Plunge the needle into them and treat until white.

Direct Method—Technic is the same only instead of drawing current through, connect up to the regular fulguration

current directly with the fulguration electrode and turn current on gradually until tumor turns white. Just as good results will be obtained but the current is harder to handle.

Adenoma.

If they are small, can be treated the same as papilloma. If large, however, are better handled by the electro-coagulation method. That is: connect one terminal of the D'Arsonval (diathermy) current to the needle and the other to a piece of block tin on back. Insert in the tumor and by means of the foot switch turn on the current for an instant. Better results will be obtained if a large amount of current is turned on, 1,500 ma. or more, depending upon the size of the tumor.

Condyloma.

Institute anti-syphilitic treatment. Cover the affected parts with four layers of gauze soaked in the following prescription:

Copper sulphate	18 gr.
Tannic acid	40 gr.
Tr. opium	1 oz.
Aqua qs. ad	3 oz.

Shake before using.

Cut a piece of block tin, a little smaller than the area to be treated. Connect it to the positive pole of the galvanic current, place it over the gauze, and bind in position. Connect the negative pole to a larger pad placed on the abdomen. Turn on the current and give a comfortably strong current for seven to ten minutes. Now give your patient a bottle of the same prescription with directions to apply sufficiently often to keep the parts saturated. Have him return in four or five days, and, if the condyllomata are not gone, repeat. One or two treatments usually suffices to clean them up.

Chancre.

Cover the chancre with a film of cotton, just big enough to cover it, having previously soaked it in a two per cent solution of cocaine. Connect the positive pole of the galvanic current to a copper intra-uterine electrode and the negative to the abdominal pad. Grasp the penis in one hand and using the electrode as a pencil, place it gently against the cotton. Have your assistant turn on a very small amount of current, say ½ of a ma. Let it run a few seconds, and have her increase it another ½ and so on until about three ma. are being used. Let this run for a minute after which the parts are usually anaesthetised. Now have the assistant gradually turn it on to five or ten ma. This will now start driving the copper from the electrode down through the cotton and deposit it in the chancre. Continue the treatment until the chancre is thoroughly coated a greenish gray. By taking plenty of time and increasing the current gradually you can completely cauterize it and deposit the copper without causing your patient a bit of pain. After a few minutes it may be sore, which will last several hours, but is usually easily controlled with hot applications. It usually heals in two or three days' time. If, after five days, it is not healed, it would be well to repeat the process.

Chancroid

Can be satisfactorily treated the same way. However, I like to coagulate them the same as when treating papilloma.

Stricture

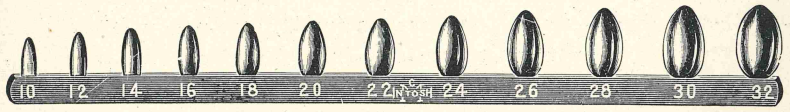
The results of proper treatment of stricture is satisfactory in about 90 per cent of the cases, when properly done. Do not use this method for stricture of the meatus. The best way to handle it is to slit with a knife.

Technic—Find the largest sound that will pass through and select a dilating olive two sizes larger. Screw this into

the staff and connect staff to the negative pole of the galvanic current; the positive to the usual abdominal pad. Now insert into urethra against the stricture and make firm, gentle pressure. Turn on the current gradually until three milliamperes registers. Do not exceed this amount, as it is sufficient to soften and relax the scar tissue and by keeping the strength low you avoid all danger of a burn which, if produced, aggravates the condition. In about five minutes the olive will slip through the stricture. Now gently pull it back until it slips out of the stricture, then turn off the current and remove. In three days' time repeat the process, using an olive a size larger. Repeat until about a 30 olive can be passed. In some cases a 28 is sufficient. Now treat about once weekly with this olive for a few times until you are sure the results are permanent.

Stenosis of Cervix

Same treatment exactly as outlined above for urethral stricture. See cut of olives.



Ulceration

If in inside mucous cavities, I prefer the silver nitrate method outlined for canker of mouth (see eye, ear, nose and throat section). If on outside, or skin surface, same as outlined under skin diseases (varicose ulcers).

Erosion

Remember the three indications: mechanical, chemical and thermal. Usually the erosion itself can be best treated with copper cataphoresis, using the cervical cup electrode (see cut) placed against the erosion, connected to the posi-

tive pole; negative to the usual abdominal pad. Turn on ten ma. for ten minutes. Treat twice weekly. In a few treatments, it will be cleared up. Now test the secretions which are usually stringy and ropy and you will invariably find them acid. If you let this go, in a few days' time your erosion will be right back. Now cover the erosion electrode soaked in ten per cent potassium iodide or Dakin's solution and place in vagina against cervix. Connect to the negative (alkaline pole), positive to abdominal pad. Turn on five ma. for five minutes. After two or three treatments you will note the stringy discharge has changed to a thin mucous and the membrane is quite normal in color. Three or four treatments of the same length of time will usually suffice to restore the reaction to about neutral, after which nature will take care of the balance. The erosion will then stay cured. If the cervix is large and indurated, it is advisable to follow the negative galvanic with three minutes of surging sinusoidal for mechanical effects, that is, drainage. The temperature taken here is sometimes subnormal and would seem to indicate diathermy; however, if you get the marked acid reaction, remember that diathermy will not change it and negative galvanism will bring the best results.

Erosion Electrode

Endocervicitis

First test the reaction; if acid, which it usually is, do as follows: first we must remove the mucus, which under ordinary methods is almost impossible to do. Remembering that the positive pole is a dehydrater of tissue, we will select a copper uterine electrode of the right size to snugly fit the cervical canal and insert it against the internal os

(note if electrode does not have an insulated tip, a drop of shellac placed on it and allowed to dry will have the same effect. This is important, otherwise you are liable to produce a burn. Connect the electrode with the positive pole of the galvanic current; the negative to the usual abdominal pad. Turn on the current until 10 ma. registers. In about five minutes you will find the electrode stuck. Now turn off the current and forcibly pull electrode out. You will find the mucous plug dried and stuck to the electrode, leaving the mucous surface of the cervix clean. Now insert a probe, covered with cotton and soaked in iodine solution. Connect this to the negative pole and the positive to the abdominal pad. Turn on 5 ma. for five min., and follow with three minutes of the surging sinusoidal if there is much induration of the cervix. Three or four treatments, at three to five-day intervals, usually suffice to cure the worst cases.

Endometritis

We all know the futility of curettement for endometritis; it is almost always followed by return of the inflammation and it reasonably should be, for we know that it is impossible to go in and scrape out every microscopical cell of the pyogenic membrane.

By copper cataphoresis, using a sufficiently strong current to also destroy the diseased membrane, we can usually clear these cases up in three weeks' time. Select an intra-uterine sound of the right length and see that the tip is insulated. Place it well into the fundus and connect to the positive pole; the negative to the abdominal pad. Turn on fifteen or twenty ma. for ten minutes. Occasionally move the electrode about to prevent pricking. The result of this treatment is a deposit of the copper deep into the tissues and partial destruction of the membrane. In about three weeks the purulent discharge will cease. If the patient does not menstruate for two or three months, don't be alarmed, for

sometimes it will take that long before a new functioning membrane will form.

Caution—Be sure and rule out tubal infection before using this treatment, otherwise you are liable to flare it up.

Membraneous Dysmenorrhoea

This rare, incurable condition is very easily cured by negative galvanism. Insert the uterine electrode as mentioned above, only instead of using the positive pole, use the negative; the positive being connected to the abdominal pad. Give 5 ma. for five minutes. Repeat every day until the membrane quits forming. This I find productive of much better results than using ten to twenty ma. and actually burning or destroying. I usually follow the treatment with three minutes of the surging sinusoidal. I have cured two cases, both in two months' time.

Rectal and Sigmoidal Catarrh

Must have proper treatment through the sigmoidoscope, using krameria or kino.

The slow sinusoidal on the pelvicmultimode, I have found very useful to develop peristaltic action; also the surging galvanic, negative pole to the rectal bag, to bring back defecation sense (see constipation).

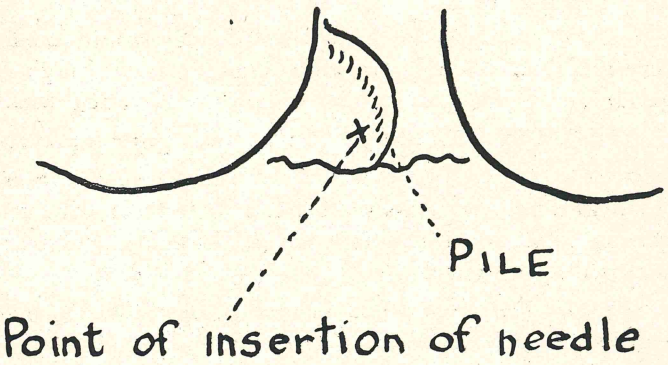
Piles

I divide into two classes according to the treatment required. The soft for reconstructive, and the hard or sclerosed for destructive.

The soft—First treat with quinine according to the Ireland method and then insert into the anus the largest aluminum dilator that can be comfortably borne, having previously drawn over it a moistened fish-skin-condom. Connect this to the positive pole of the galvanic, the negative to the abdominal pad; or place them on the pelvicmultimode. Give them a comfortably strong current for seven to ten minutes.

The quinine affects the offending pile, but does not affect the other veins of the pile bearing area; the galvanic does, therefore increasing the efficiency of the treatment tremendously.

The hard—Formed sclerotic or adenamatous piles require destruction. They can be treated with the knife, burned with the cautery or by the carbolic acid method. Electro-coagulation makes a very nice way of handling them. I usually anaesthetise with anaesthaine or some other good local anaesthetic and then plunge a needle into the pile about one-third from the apex (see cut). Having previously connected one terminal to the needle and the other to block tin, using 1,500 ma. or more of the D'Arsonval current, turn on the current with the foot switch until the pile turns white. In about a week it will drop off, leaving a good, healthy, granulating surface. There is not, as a rule, much pain, but considerable soreness afterward, which can be controlled by sitz baths and hot applications.

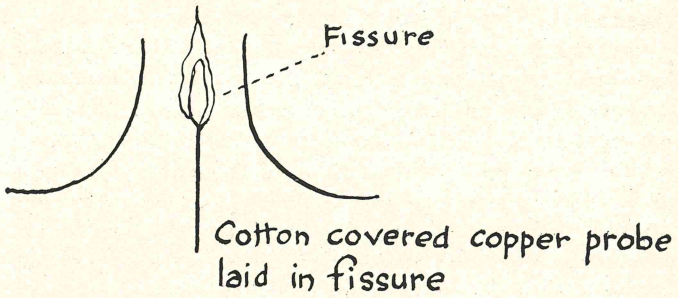


Fissure

About the same line of treatment for this as used for chancre. Take a piece of copper wire and wrap it with a thin layer of cotton soaked in a two per cent cocaine solu-

tion. Place against fissure and turn on the galvanic current, positive pole to fissure, negative to abdominal pad. Give ½ ma. for a minute and gradually increase ½ ma. at a time until about three ma. are given, at which time the fissure is usually thoroughly anaesthetised. Now shoot the current up to between five and ten ma. for a few minutes until the fissure is coated with the copper.

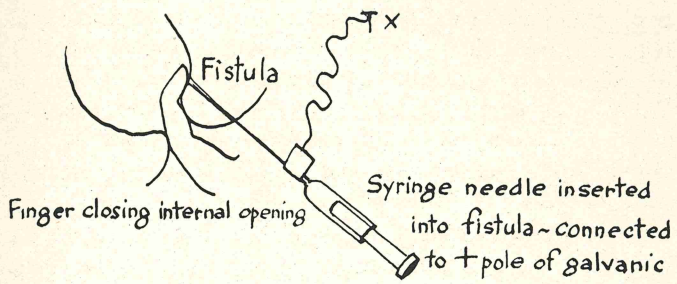
One to three applications at five-day intervals will, as a rule, heal the average fissure. If this fails, anaesthetise quinine and urea, incise, and curette fissure. Don't fail to cure up all existing proctitis and constipation.



Fistulae

This method of treatment produces very satisfactory results not only with anal fissure but fistulae elsewhere as well. It does not always work, but even in those cases requiring actual surgical interference it should be used as a preliminary treatment, for the reason that with it we are able to obliterate branching channels, which the surgical methods will not touch.

1st step—File off the sharp end of a No. 18 gauge, long, hypodermic needle, and smooth off blunt. Place it on an ordinary 5cc. glass hypo syringe, which has been filled with a saturated solution of copper sulphate. Connect the positive pole of the galvanic current to the needle by means of



a Morse clip. Connect the negative pole to the abdominal pad. Now insert the lubricated finger of one hand into the rectum and close off the internal opening.

Then insert needle into fistula, and slowly inject solution until the fistulous canal is filled, and it starts draining out. Have your assistant turn on the current until, about three ma. registers. If this causes burning cut it down. Inject a little more, then wait a few seconds, and so on taking about seven minutes to the treatment. Treat at five-day intervals. If four or five treatments do not clear it up, surgery is as a rule indicated. Silver nitrate with this method using a ten per cent solution, also works very nicely.

Occasionally where the fistulous tract is of long standing and hard and fibrous (feels cord like), negative galvanism using 10% solution of caustic soda works better, employing the same technic. However this method only softens up the tough tract and usually has to be followed by the method mentioned above before cure is effected. My method in this class of cases is to alternate the two treatments, until the duct is thoroughly softened and disintegrated, after which the copper is used until it entirely heals. The greatest difficulty with these cases is to get the internal opening closed, after this is done it rapidly gets well. The technic for the last treatment is exactly the same as the former only the negative pole is attached to the syringe and

the positive to the abdominal pad. The preceding diagram shows the method.

Nephritis, Pyelitis

Place the patient on the pelvicmultimode in the usual manner. Place a piece of block tin over the kidneys and attach one terminal of the D'Arsonval (diathermy) current to this and the other to the reservoir of the stand. Give a comfortably hot current for ten minutes followed by five minutes of the surging sinusoidal for massage effects. This, along with regular treatment, has produced some very remarkable results in chronic Bright's disease.

Pyelitis calls for the same technic. Chronic interstitial nephritis calls for the same technic. If the nephritis is acute in character the Tesla coil should be used in place of the D'Arsonval until the acute symptoms have subsided.

Cystitis

Irrigate with boracic acid followed by instillation of one ounce of (picric acid, one part, to boracic acid, nine parts). Then place the patient on the pelvicmultimode. Insert Neiswanger's bag in the rectum and connect the slow sinusoidal current to the rectal bag and reservoir of the stand. Give a comfortably strong current for five to ten minutes or until they get a good definite feeling as if they had to urinate.

If the microscopic picture shows an abundance of colon bacillus or bacillus vulgarus, I add to the picric acid instillation one tablet of Hynson, Wescott and Dunning's bulgaria tablets. Treat them twice weekly. I give internally one dram of a one-tenth per cent solution of tr. Belladonna and Cantharis, every two to four hours according to the severity of the symptoms.

Urinary Retention and Suppression

There is no one treatment that works so nicely on this condition when due to temporary paresis, as, following

pelvic operations, or from catching cold, severe infections, etc., as will the pelvicmultimode, employing the slow sinusoidal current in the same manner as given under cystitis. You can treat the case every two or three hours up to every other day according to the character of the case.

Urethral Caruncle

Ordinarily very refractory to treatment, but readily yields to galvanic current in partially destructive doses.

Technic—Cover caruncle with film of cotton soaked in weak cocaine solution. With an ordinary copper sound, connected to the positive pole, negative to abdominal pad, anaesthetise the caruncle for five minutes with about three ma. current. Then run the current up to fifteen ma. and apply with gentle pressure, until the caruncle is green and shriveled up. One treatment is, as a rule, all that is required. However repeat in ten days if necessary. The caruncle rarely returns after this treatment.

When treating pelvic diseases, remember your treatments are divided into two main classes, constructive and destructive. Destructive, remember, frequently has to be employed, but is not curative, it simply removes some end results of some other condition, and should be followed by the proper reconstructive treatment whatever it may be. Constructive treatment should be given daily until results are produced, then less often. You wouldn't give digitalis for a bad heart once a week and expect much from it.

Don't use heavy dosages of copper cataphoresis for pus tubes. I know it is recommended, but it is too often followed by flare ups. Don't try to treat an active pus tube, that is not draining, with any electrical current. Rest, heat, etc., are indicated. Don't use ice packs. Frequently test with the electrical method for confined pus in the pelvis, particularly where it looks suspicious. It is an indication to stop your present line of treatment.

CHAPTER VIII
THE SKIN AND EXTREMITIES

Thoroughly learn the tests mentioned under electrical-diagnosis for peripheral and central paralysis, also the reaction of degeneration.

Paralysis

Peripheral. Diagnosis having produced a deficient reflex showing the condition to be of peripheral origin, we must then consider the best method of treatment. If reaction of degeneration shows and no response is elicited with the faradic or rapid sinusoidal, either one, we must then treat that case with the interrupted galvanic (no attention is paid to poles).

Locate the motor point of the corresponding muscle on the well side. Place one pad connected to one of the poles on the abdomen. Place the other electrode, small, about one inch square or smaller depending upon muscle, over this motor point. Turn the selector switch to interrupted galvanic, and turn on just sufficient current to produce a perceptible contraction. Now place the electrode over the corresponding motor point of the affected muscle and let the current run until six or seven contractions are given. Set the rate of interruptions to about ten a minute. If the muscle is so dead that no contraction is produced, you will then have to be governed by the deflection of the needle on the milliampere meter.

Don't give any more contractions than this at a setting. The next day repeat. In a week or ten days again test for the reaction with the interrupted rapid sinusoidal. If it reacts to this, the galvanic must be discontinued and this

current used. Give the same number of contractions as when using the galvanic using the same technic, that is, finding the weakest amount of current to produce perceptible contraction on the well side. Six or seven per day. Do not increase the number until good regeneration of the muscle has occurred.

If much atrophy of the muscle is present, it would be better to now switch to the slow sinusoidal current, and treat with a comfortably strong current for three to five minutes. The best method of applying this current to the extremities, is one pad over the motor point and the foot or hand immersed in water connected to the other terminal.

Otherwise place the pads in such position as to get good contraction of the muscles affected.

Cerebral

Treatment direct to the affected muscles will do more harm than good if the case is of cerebral origin. Very good results are frequently produced by using galvanism through the head. Place a pad about two inches wide and four long over the forehead, and another about four by four over the nape of the neck. Turn on five ma. current for five minutes, gradually increasing to ten minutes from treatment to treatment. Connect the positive pole to the pad on forehead, negative to one on neck. It is impossible to prognose what the results will be from this treatment. But if when used along with your regular treatment, no improvement is seen in say eight weeks time, you can be pretty sure that no benefit will arise from it.

Abscess and Blood Poison

Local—Can best explain by giving a case. A patient came to me suffering from a slight abrasion of the thumb. Red streaks extended up the arm. The glands of the axilla and neck were swollen and tender. Temperature, 102.

A piece of cotton soaked in copper solution was placed around the thumb over the abrasion, and this covered with a piece of block tin a little smaller than the cotton, and connected to the positive pole. A towel was then soaked in 10% potassium iodide, and placed over the axillary glands and covered with block tin, connected to the negative pole. Ten ma. current was then turned on, after a few minutes this had to be cut down on account of irritation. After ten minutes the current was gradually turned off. A mild auto-condensation treatment was then used with the Tesla current connected to the auto-condensation couch. The current was drawn out over the affected glands and down the course of her arm. A fifteen minute treatment was given. I then prescribed for her a good elimination. She had some pain for a few hours afterwards which was controlled with hot applications. Twenty-four hours afterward she was free from symptoms and temperature was normal.

If you can get these cases before actual pus formation you can as a rule abort them. If benefit is not shown in twelve to twenty-four hours repeat the treatment.

If pus has formed, give it surgical drainage, otherwise treat the same.

Chronic abscess with induration might call for reversal of the treatment. Test the pus and if acid, then cover with cotton saturated with Dakin's solution or potassium iodide ten to twenty per cent, and use the negative pole at the site of the disease. The strength does not matter. So many doctors continuously ask me what strength to make the different solutions. When employing cataphoresis, the effect produced depends upon the strength of the current plus the length of application and not the strength of the solution.

Rheumatism

Acute rheumatism is best treated with 1,500 watt light over the affected muscle or joint; at the same time drawing the Tesla current through the affected part by the indirect method of diathermy. Treat until relieved and repeat when required.

Chronic Rheumatism

Local—Diathermy for fifteen minutes to an hour depending upon severity and results from previous treatments. Always follow the treatment with surging sinusoidal for three to five minutes. On alternate days use negative galvanism over the affected area applying soda salicylate in about a twenty per cent solution using a towel folded to the right size and soaked in a hot solution of this remedy, applied to the affected area and then covered with block tin attached to the negative pole. Bind in position with bandages, or use sand bags. Connect the positive pole to a pad the area of which is larger than the active electrode just mentioned, place it at some indifferent point, usually the abdomen. Give a comfortably strong current for about ten minutes, although I never go above twenty ma. Follow the treatment with the surging sinusoidal.

Three times weekly give these cases auto-condensation with the D'Arsonval current for constitutional effect. At first this may increase the rheumatism on account of throwing an increased amount of urates, uric acid, etc., into the blood stream; however, in a very few treatments decided improvement will be noticed. Don't fail to thoroughly examine and remove any existing splanchnic insufficiency particularly a colitis with stasis.

Acute and Chronic Neuritis

Respond to the same line of treatment. As a rule the rapid sinusoidal to tire out painful reflex is not good technic, however, in sciatica with the pelvicmultimode, I

have produced some very good results with it; but before so doing, the following is the best method to try. Place the patient on the pelvicmultimode, start suction, etc., in the usual manner, and connect the binding post of the reservoir to the active terminal of the Tesla. Now insert the long rectal electrode (Page 106) into the rectum and then turn on a medium strong current. Now grasp the electrode in the hand and direct it toward the sciatic notch of the affected side. The minute you strike the sciatic, a tingling feeling will go down the leg. If the patient complains of the current being too hot at the rectum, cut it down by putting one or two fingers of the free hand somewhere on the patient's skin. After treating five or ten minutes this way, I then let go of the rectal electrode and run my fingers down the course of the sciatic, drawing the current out, paying more attention to the tender areas. I treat all told about fifteen minutes and then connect the rectal electrode to the surging sinusoidal and the reservoir of stand to other terminal of same current. Then turn on a comfortably strong current set at the rate of the respiration, and direct the rectal electrode to the sciatic notch. When you locate the nerve you will note a contraction going down the course of the sciatic. This massages and breaks up adhesions and hastens absorption of decomposition.

A course of two or three weeks' treatment will usually clear up the worst class of these cases. Treat every day.

Varicose Ulcers and Other Indolent Ulcers

If the ulcer is chronic and indurated, cover it with a layer of cotton soaked in potassium iodide or Dakin's solution and cover this with block tin connected to the negative pole. The positive pole is attached to a larger electrode placed at some indifferent point. A comfortably strong current, which varies according to the size and location of the ulcer, is passed for ten minutes. After the induration has been softened up and if granulation and good healing

is not then started, switch to copper, and the positive pole, using 5 ma. current for ten minutes.

If the case shows an indolent infection which does not respond to the above treatment, I then combine copper and zinc. Soak a piece of cotton in a two per cent solution of zinc sulphate and apply over the ulcer. Then apply over this, a piece of copper plate cut to proper size and connect to positive pole, negative pad in close proximity. Give five or ten milliamperes, sufficiently long, to drive the copper through the cotton and deposit it with the zinc in the ulcer. This is usually followed by quite a reaction, and healing immediately starts. One or two treatments of this kind is all that is usually required. (See illustration.)

Dandruff and Falling of Hair

Place the patient on the auto-condensation chair, connected up to a weak Tesla current and thoroughly massage the scalp, pulling the current out at the same time. Treat for five or ten minutes until a good reaction is produced. The scalp will feel sore for a day or two at first. The dandruff will apparently be increased, but this is because it is loosened up. Falling of the hair will stop almost immediately.

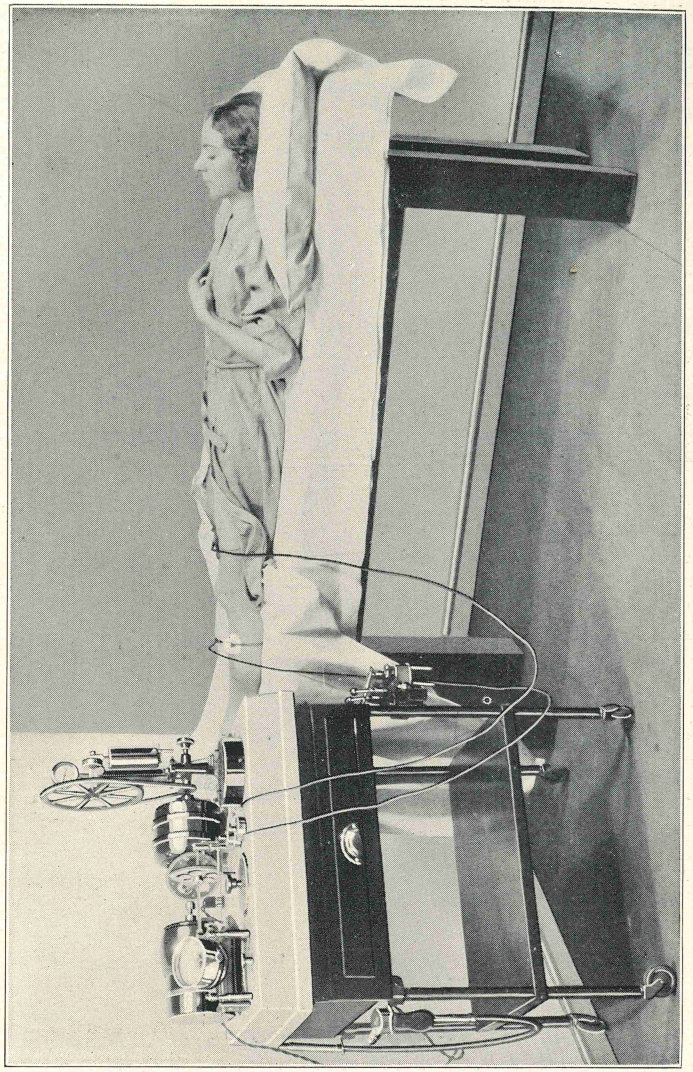
This method is far superior to the vacuum tube method and another point is your patient does not know what she is getting. There are so many violet ray outfits in the home, that they sort of look on this as something common.

Eczema and Psoriasis

Cover the eczematous patches with the following perscription:

℞

Resorcin	40 parts
Acid salicylic	2 parts
Zinc oxide	10 parts
Lard	20 parts
Olive oil	8 parts



Positive Galvanism, Zinc Sulphate and Copper in Varicose Ulcer

See that the resorcin is ground fine, and that no substitutes are used. Smear over the affected area, and then with a small vacuum tube deliver a sufficiently strong spark, which in a few minutes will turn the medicine brown. It will also smoke.

Repeat the treatment every day or two until the eczema or psoriasis exfoliates.

Warts, Moles and Other Small Skin Growths

Are best removed by the indirect method using the Tesla coil.

Technic—Set patient on auto-condensation chair and turn on a medium strong Tesla current from active terminal.

Now with an ordinary probe draw a spark out of the growth. A piece of rubber may be laid on the skin near the growth to rest the finger of the operating hand on to steady the treatment. Control the current with the fingers of the other hand. Spark it quickly until it commences to turn white, which now anaesthetises it and allows you to apply it more steadily until the whole area is thoroughly fulgurated.

Acne Indurata—I usually treat the same as for warts. Only I do not burn extensively. Usually I use a sharp pointed probe and as I am burning gradually press it into the tiny pus cavity. Do not pinch the acne as this forces infection into the tissues, which later on will set up another active area.

Epilation

Removal of hairs may be accomplished by the high frequency current, but not so well as with negative electrolysis.

Connect the negative pole of the galvanic, to a suitable needle holder and needle, the positive, to a indifferent pad. By the aid of a magnifying glass, insert needle into hair

follicle, turn on ½ ma. current. In a few minutes, bubbles can be seen around needle. Remove needle (you will not have to stop current) and see if the hair pulls out easily with tweezers, if not repeat until it does.

When done improperly, about ten per cent of the hairs will return.

Varicose Veins

Place patient on auto-condensation table connected to the Tesla, delivering a medium strong current. Have the leg elevated and massage down the course of the vein with one or two fingers. Treat for fifteen minutes three times weekly. Apply bandage or elastic stocking until the condition is better. Never neglect a thorough examination of the pelvis in these cases, in either sex, for invaribly you will find existing trouble interfering with return venous flow of blood.

Broken Arches, Painful Feet

Place in two porcelain pans two pieces of tin connected to the slow sinusoidal current. Place over this a towel and fill with water to just cover the top of the toes, placing a foot in each of the pans. Now turn on a sufficiently strong current until a decided contraction is produced. This will markedly strengthen the foot and relieve the tired condition. Treat for five minutes. And then bandage if a fallen arch. The figure 8 adhesive is good. Begin applying it at the center of the outer margin of the bottom of the foot. Draw it straight across the sole and over the arch and around the ankle. This pulls the arch upward.

Non-union Fractures

Place two suitable block tin electrodes, so that your heat point will come at the non-union. Give the usual dosage for ½ to 1 hour. Treat every day until union starts.

Every fracture should be splinted with heavy tin foil for electrodes and mild doses of diathermy given every day. It insures a more rapid and better union.

See cuts of different methods of application on following pages.

Pruritis

Can be treated by two methods: A mild spark from the Tesla current until the itching is relieved; or negative galvanism for softening effect on the skin. The formula and method for eczema if the itching is accompanied by this.

Pruritis ani and Vulvae

On examining, you will find several little red points under the skin which will not yield to the usual methods of treatment mentioned above. I have worked out a destructive method which has produced some very excellent results.

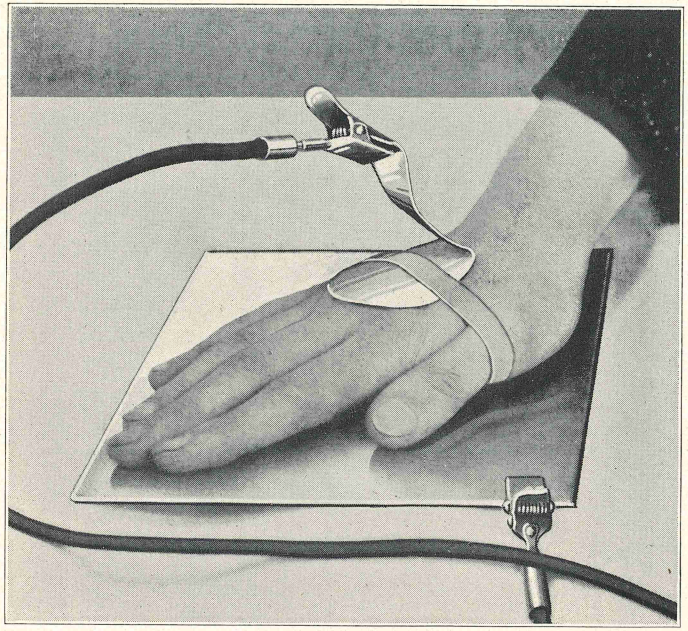
Place in an ordinary hypo syringe ten or fifteen minims of a four per cent solution quinine and urea. Connect the needle to the positive pole, the negative to the abdominal pad. Insert needle under skin at red point and inject a drop of the quinine solution. Now turn current on until about 3 ma. registers. In a few minutes the red point blanches. This destroys the irritated nerve terminal in the red spot and after you have treated the majority of these, you will find the itching easy to control. Be sure and treat any existing subcutaneous channels, or any acrid discharges.

Ankylosis

Bony ankylosis of course cannot be affected by electricity. However, many cases supposed to be bony ankylosis are mostly fibrous and you will be repeatedly surprised to see them clearing up after treatment with D'Arsonval diathermy for ½ to 1 hour followed with five minutes of the surging sinusoidal current. Immediately afterwards use passive motion, forcing the joint, in every direction, always to the point of producing a little pain.

Arthritis Deformans

You will be surprised how many of these cases will respond to the same line of treatment. It is also a good plan to give them auto-condensation three times weekly for constitutional effect.



Direct D'Arsonval Diathermy of Metacarpals

IN CONCLUSION

I cannot treat your cases for you. I can only give you a foundation to work on. You must use your own brain. You cannot work mechanically and get results. No matter what you read, always diagnose your cases, according to the three fundamentals and select your currents accordingly.

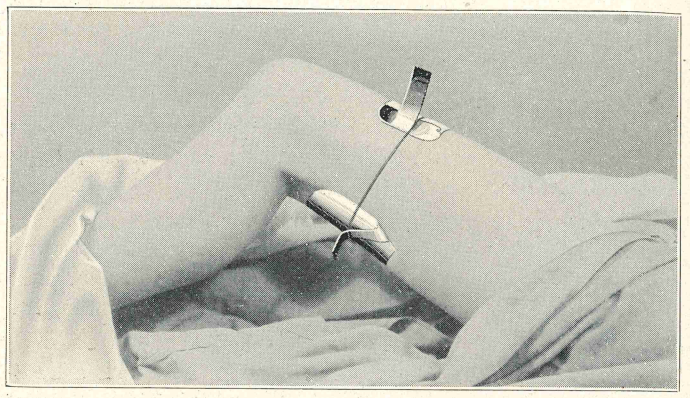
Mechanical, Thermal and Chemical; Sinusoidals, High Freq., Galvanic.

Use each modality in its proper place, always remember the three fundamentals, and whenever you get lost, or are not getting results, go back and re-examine and correct your mistakes. I and every one else will have to do this, for our methods of diagnosis are far from perfect.

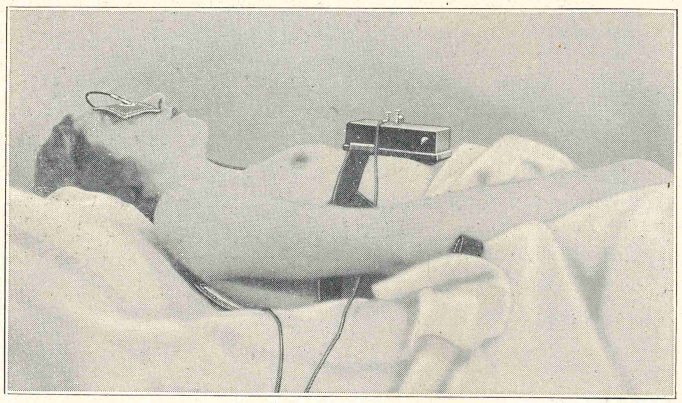
Whenever a person tells you, that such and such a treatment is good for such and such a condition, if he cannot show you definite reasons why it should be good, never use it. Remember, that something mysterious produces mysterious results, i. e., you do not know why your patient got well or why she did not. This is far from definiteness, therefore far from scientific. A science is always definite.

Never blame your different apparatus if you don't get results. Remember they are only machines; they have no brains; they can't work without brains. They would not be recommended if there was not some value in them. However, some outfits are far more valuable than others. Find out which is the best before you buy. Don't make the mistake of buying cheap apparatus—you get what you pay for as a rule—and when it comes to treating the sick, the best is none too good.

The following cuts and drawings show a few methods of application.

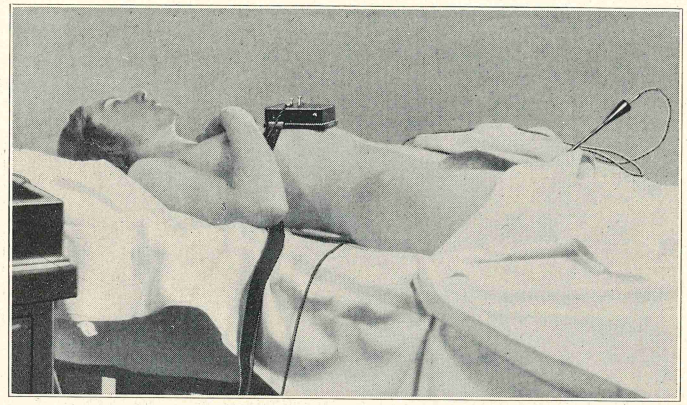


D'Arsonval Diathermy of Leg for Fracture, Periostitis, etc.



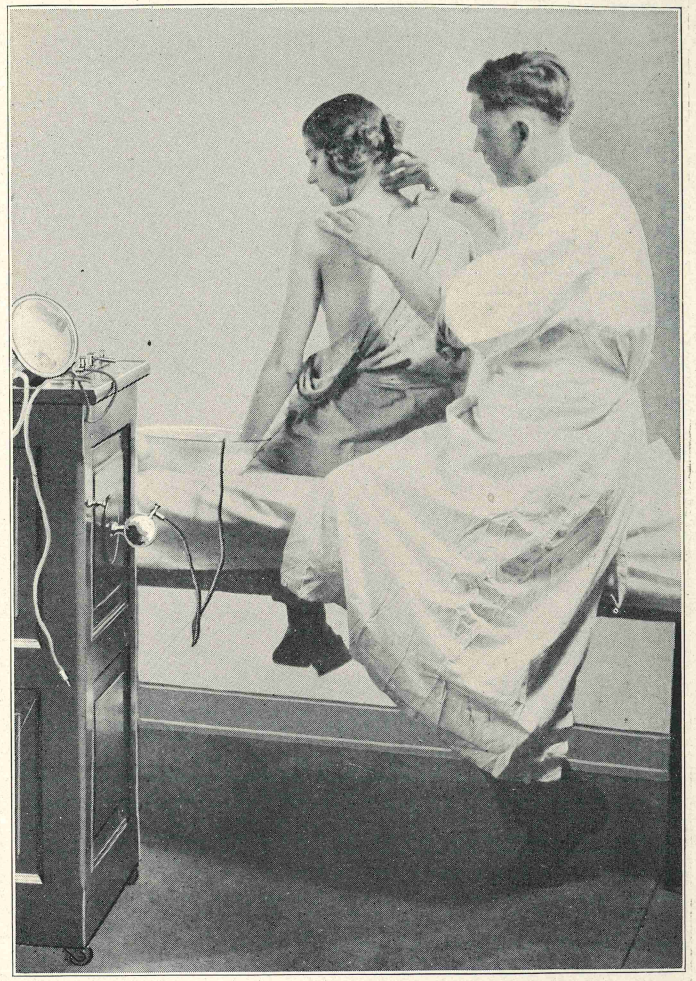
Respiroidal Current from Respiratory Interrupter for Asthenopia, High Intra-ocular Pressure, etc.

Direct D'Arsonval Diathermy Frontal Sinusitis, etc.



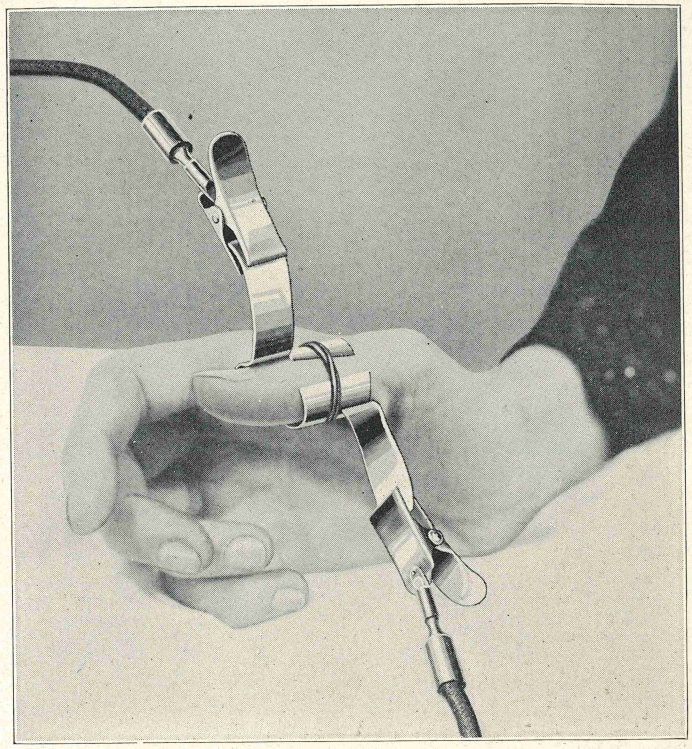
Respiratory Interrupter—applying Respiroidal Current for Uterine Tone

"Waggoner" Respiratory Interrupter

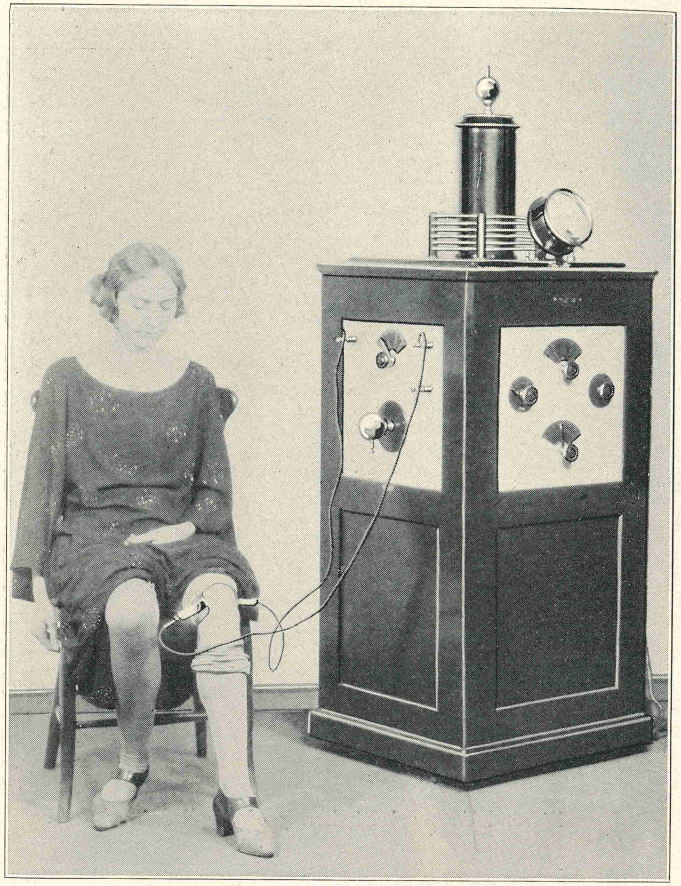


Indirect Tesla Diathermy for Brachialgia

Direct D'Arsonval Diathermy for the Chronic Antrum (Sinusitis)



Direct D'Arsonval Diathermy of Small Joints



Direct D'Arsonval Diathermy of Knee

Direct D'Arsonval Diathermy for Neurtis of Shoulder

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THE NOTE BOOK OF AN ELECTRO-THERAPIST

MEL. R. WAGGONER, M. D.